UNITED STATES ARMY

OCTOBER 1966

AVIATION DIGEST

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UNITED STATES ARMY AVIATION DIGEST

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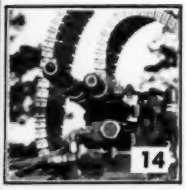

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The mission of the U. S. ARMY AVIATION DIGEST is to provide information of an operational or functional nature concerning safety and aircraft accident prevention, training, maintenance, operations, research and development, aviation medicine, and other related data.

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Articles, photos, and items of interest on Army Aviation are invited. *Direct communication is authorized to: Editor-in-Chief, U.S. Army Aviation Digest, Fort Rucker, Alabama.*

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LETTERS

IN A RECENT DA publication an article appeared concerning the additives in aircraft engine oil. It appeared to be in conflict with an article published by the Digest in Aug 65 entitled "Are You Confused?" Since the Digest article appeared, a study was made of these additives, rendering the material contained in the DIGEST to be in conflict with current procedures.

At this printing AVCOM is making a change to TB AVN-2 to be published in the future. Meanwhile, oil containing cyclohexanone may be used for one time use or emergencies only, according to information received from AVCOM.

Editor-in-Chief

Sir:

In reference to the article, "Survival Once Over Lightly," U.S. Army Aviation Digest, June 1966, the following comments are submitted concerning that portion pertaining to the treatment of snake bites:

a. The Surgeon General's policy on first aid therapy of snake bites is that incision at the site of the bite be performed only by Medical Service personnel. This policy is appropriate because a certain amount of professional judgment (based on specialized training and experience) and availability of the proper equipment are essential to avoid both unnecessary and improperly performed incision. This would have special importance under survival conditions when anything restricting mobility or possibly predisposing to subsequent infection might cause greater difficulty than the effects of an unincised bite.

b. It should be noted that the value of incision and suction is negligible unless instituted within one hour after the bite and preferably within fifteen minutes.

In consonance with the above cited policy, the Snake Bite Kit, Suction, FSN 6546-952-5325, was classified as obsolete for the Army in the Federal Supply Catalogue, DOD Section, Medical Materiel.

LTC ROLAND H. SHAMBUREK
Chief, Aviation Branch
Office of the Surgeon General

Sir:

In keeping with the recently stated desire of the staff of the Digest to improve the publication in such a way that a greater number of those in Army aviation could truly say with pride "That's our magazine," I have a proposal to make that may or may not meet the approval of others.

For years, Approach, the Naval Aviation Magazine, has published what it calls "Anymouse" reports, which are anonymous, informally written relations of unsafe or hazardous situations and experiences encountered by personnel throughout all echelons of naval aviation, and which are similar to our "Share It" reports. Each month, Anymouse reports are selected with an eye toward general interest and published for all to see. These reports have much more meaning to the majority of readers than the pages of short accident descriptions and dollar cost figures which permeate the volumes of safety material in all the services. We all realize that accidents occur whenever a large group of men finds itself pushing iron around the sky. But it would be nice to read the reports and stories of mistakes others have made, as well as *why* they made them, in their own words, rather than from the standpoint of an investigating officer at some obscure Army airfield.

I feel that self-mailing forms for submitting these reports should be made readily available to every Army aviator, crewchief, GCA controller, et al, addressed to the DIGEST and/or USABAAR, with the same encouragement given to submitting them that is given to the subject of brushing your teeth after every meal. Maybe we could change the name of the system from SHARE IT to ARMYMOUSE . . . or something.

SUGGESTIONMOUSE

• *Your proposal under consideration—*

EDITORMOUSE

Sir:

Reference Aviation Digest, July 1966, the article "Challenge the Assumption," by LTC Milton P. Cherne.

I indorse Colonel Cherne's idea of an annual examination of officers, as an aid to the officer, to show him where his weak areas of knowledge lie. How often I have wondered if I am up to par in all areas in which my superiors or DA expect me to be. What new AR or procedure has been published that I have not seen? The teaching packet would settle such doubts. Here's hoping something comes of Colonel Cherne's idea, besides just another article in a magazine.

CW2 GORDON E. R. PRESTON
6th Battalion, 27th Artillery
APO San Francisco 96307

Sir:

The article titled "Nonconcur" appearing on pages 40 and 41 of the July 1966 edition of your magazine contains misleading statements and photographs. In fact, it has generated inquiries from the field about the proper installation of hardware in the U-6A tail-wheel pickup bracket.

The top photograph on page 41, labeled "Correct Installation" does not show the necessary structural washer P/N CSP-5A beneath the nut P/N AN310-5. The lower photograph labeled "Incorrect Installation" appears to be the correct installation. However, a degree of uncertainty remains since the flange of an improperly installed bushing P/N C2FS-1045 could be mistaken for the structural washer.

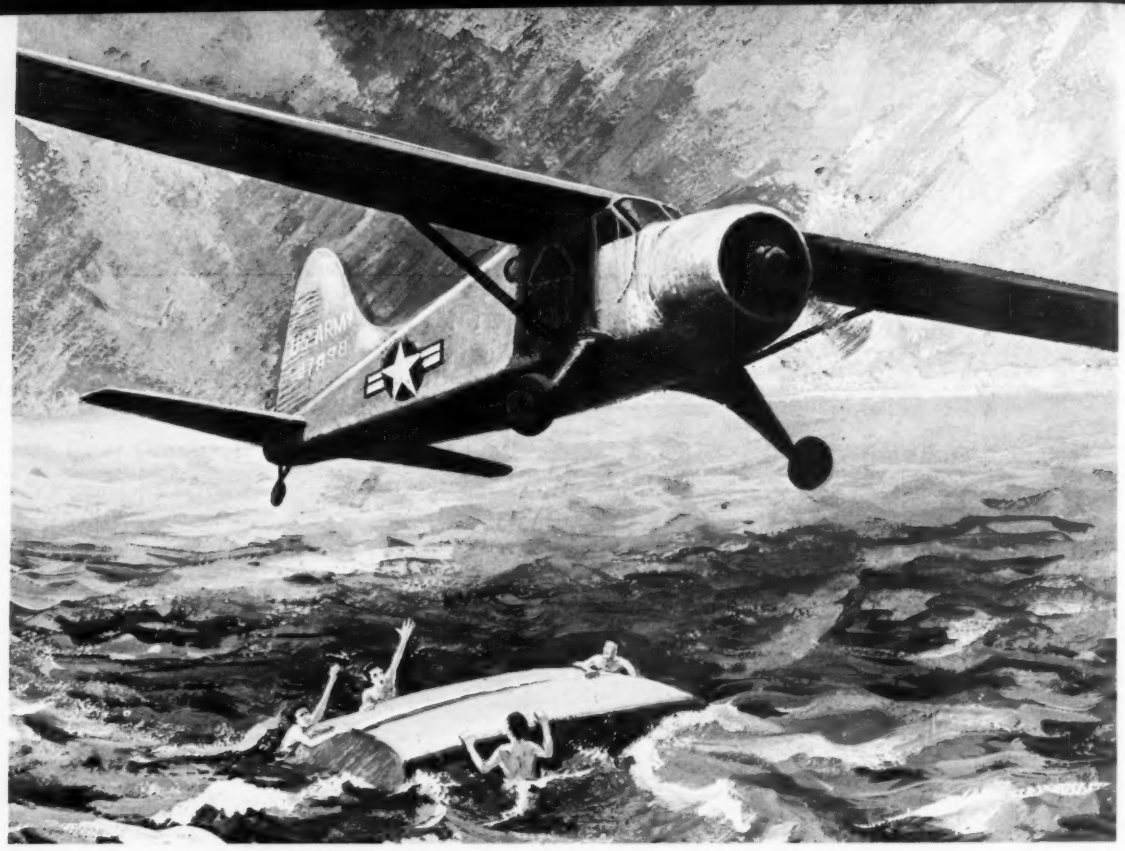
When properly installed the flange end of the bushing is inboard. At the outboard end of the bushing are the structural washer, an AN960C516 washer and the nut. Additional AN960C516 washers may be used between the structural washer and nut as necessary properly to align the cotter pin hole with the nut slots.

A sketch showing the correct installation is inclosed.

COL EDWARD J. CHRYSLER
U.S. Army Aviation Materiel Command
St Louis, Missouri

• *Unfortunately, the photographs you referred to were reversed when the magazine was printed.*

To expedite publication of the correct installation, the sketch you furnished will be published in WEEKLY SUMMARY OF ARMY AIRCRAFT ACCIDENTS, INCIDENTS, FORCED LANDINGS, AND PRECAUTIONARY LANDINGS. A copy of this issue will be forwarded to you. This item will also be published in the Crash Sense Department of the November issue of the U. S. ARMY AVIATION DIGEST.—Ed.



The Need for an

FM Emergency Frequency

Captain John E. Marcus and Captain Jose A. Chapa

PUT YOURSELF in the boots of an infantry soldier in a foxhole in Vietnam who is looking to his platoon leader for guidance in the following situation. The platoon has been in the boondocks for a week trying to locate some elusive Cong and when contact was made, it was good solid contact. Enemy mortar fire now is much too accurate and the entire platoon is pinned down. No help seems to be on the way. The platoon leader has lost communications with the company commander since the batteries of his AN/PRC-25 have lost all their pep and the Cong long ago cut all the wire that the commo sergeant had so painstakingly laid out. To add a bit more spice to the situation, the platoon's SOI is out of date. This was supposed to be a two-day mission. Ha!

Suddenly, the familiar whup, whup, whup of a Huey is heard approaching your position. This could be your salvation, but how to communicate? You know that he has an AN/ARC-54 on board, but what frequency is he using today? The futility of your problem becomes more apparent as the helicopter disappears over the jungle. If you had known his operating frequency you could have reached him, even with your weak batteries. Then he could have relayed information of your desperate situation back to battalion and help *would* be on the way. Now all you notice is that mortar fire is getting heavier.

* * *

Another day, another situation. Suddenly quad 50 slugs rip into

your Mohawk and soon the left engine is burning brightly. Down comes the face curtain, and within three seconds Messrs. Martin and Baker are long loved members of the family and you and that blessed canopy are fast approaching the jungle. The next morning, after successfully using escape and evasion training to evade the Cong, you see a rescue patrol but are horrified to see a well concealed ambush waiting for them. The AN/URC-10 survival radio in your hand will transmit emergency frequency in the UHF range, but there is no hope of communicating with the patrol leader to warn him of the impending ambush.

This example is valid even if you are not a ground-fire casualty. Suppose you spotted the patrol on your way out on a surveillance mission and the same ambush awaiting it. If you had any idea of what the assigned frequency of the patrol was, you could warn them, but chances are that you would have no way of knowing. Either way, you have a case of lives lost and a mission failure because of no communications, even though the radios involved could easily net with each other.

• • •

You are flying along the New Jersey coast getting your four hours a month when you spot a pleasure craft overturned with the crew hanging on for dear life. A low pass over the boat confirms your fears that strong tides are pulling it toward the reefs and help must come quickly to avert a tragedy, but how to get help? You are out of range of your tower, and though you know the nearby Coast Guard station has FM radios, how can you net with them without knowing their operating frequency? With great sadness you read in the paper the next day that all hands were lost.

• • •

What is the common denominator in all of these situations, both military and civil, that doomed them to failure? You guessed it—an FM emergency frequency.

For many years the need for a guard frequency in both VHF and UHF ranges has been recognized. Every aviator has memorized 121.5 and 243.0 at the start of his career. When an emergency occurs he knows that a broadcast, in the blind, will bring aid from any receiving station. When all other frequencies fail and no emergency exists, the pilot knows that he can use this channel *briefly* to establish communications. Through the years many lives have been saved, and many potential emergencies averted through the use of this common knowledge. Yet, in the FM spectrum, 30-76 megacycles, fast becoming the major source of communications for our modern Army, there exists no such universally known emergency channel. If there is a reason for its nonexistence the authors are unaware of it. We heartily advocate immediate action to have one chosen so that we in the military can begin to reap the obvious benefits.

Let us explore some of the facts concerning an FM guard frequency and some of the problems that might arise. Perhaps you, our readers, can come up with suggestions that will help smooth over

There was no way to contact the Huey

CPT Chapa is an instructor, Communications Branch, Special Subjects Division, Dept of Tactics, USAAVNS Ft Rucker, Ala. At the time of writing, CPT Marcus was the senior instructor, Communications Branch, Special Subjects Division, Dept of Tactics, USAAVNS, Ft Rucker, Ala.

An FM capability would enhance survival chances

some of the rough spots in our proposal so that we may realize our goal. First of all, the Federal Communications Commission would have to set aside one particular frequency for the FM emergency channel.

For the emergency frequency to be effective, it must be completely reserved for that use only. This would require official action, preferably of an international scope. Once convinced of the need, there seems to be little doubt that all control agencies would grant this request.

We, acting on the advice of well qualified Signal Corps technicians, propose the use of 48.6 megacycles, since the existing UHF emergency channel 243.0 is the fifth harmonic of this frequency, and in many configurations would preclude the necessity for an additional antenna. Also, this frequency is well within the range of most military and civilian FM radio sets.

Since frequency allocation does not at this time seem to present any great problem, let's explore those great military bugaboos that sound the death knell to so much otherwise fine equipment and many ideas: size, weight, and cost. Since new FM radios have already been developed for both ground and airborne use, have been declared standard A, and are in production, it seems that we must approach equipment needs from the separate idea of an auxiliary receiver. It is too late to include this additional capability in the sets without extensive modification.

Our skilled friends in the Signal Corps Laboratories at Fort Monmouth assure us that if the need for a single channel FM auxiliary receiver were proved, one could be produced to be used with all existing military FM sets with the following specifications: size, 10 cubic inches; weight, ½ pound; and cost, $100 or *less*. This seems to be a small price to pay in space, weight, and cost for such a valuable addition to the capability of our FM communications network.

We should at this time consider some of the possible drawbacks of an FM guard frequency. Critics might well argue that such a widely known frequency could easily be jammed by the enemy. This is true, but quite unlikely. Emergency transmissions are usually short (requesting a listening station to come up on a given frequency) and tactically not of sufficient importance to merit jamming. The enemy has better uses for its valuable and vulnerable ECM (electronic countermeasures) equipment. The operator might grumble that here is just another black box that must be maintained and accounted for. Let one save his squad or platoon and the tune will change.

The advantages of an FM emergency frequency should be emphasized. Any FM radio, both ground or air, would be given the capability of contacting any other, regardless of operating frequency. All Army towers would, in effect, be given the added facility of backup FM communications. All variable-frequency civil FM radios would be able to intercommunicate without prior arrangements that are usually impossible in emergency situations. Survival chances would be enhanced by the addition of an FM capability (this has already been advocated in a separate Qualitative Materiel Requirement).

Surely, if just one patrol were saved because of an FM guard channel and the equipment to operate it, the money and effort would have been well spent.

ED NOTE: The Federal Communications Commission, under Congress, controls all nonfederal government frequencies and therefore does not authorize the use of military frequencies. If this recommendation was approved, the assignment of an FM emergency frequency would be the responsibility of the Office of the Chief of Communications-Electronics (OCC-E).

12th AVIATION GROUP

Colonel Raymond G. Jones

UNIQUE IS perhaps the most accurate description of the 12th Aviation Group. Consider a group headquarters exercising command and control functions over eight battalions with nearly 10,000 aviation personnel spread out over 66,000 square miles of varying terrain, supporting stability operations in Vietnam, coordinating a maintenance and supply system for nearly 1,500 aircraft and there you have the challenge. How is such an organization formed? How does it operate, and how does it figure in future Army Aviation operations in Vietnam?

The offspring of three years of airmobility testing, the 12th Aviation Group was formed in June 1965 at Fort Benning, Ga. After a brief period of training and equipping, the 12th deployed to Vietnam in August 1965 as a command element for the nonorganic Army aviation units in the Republic of Vietnam. Upon arrival, the 12th absorbed a provisional group which had been organized in country to serve as an interim command headquarters for the four existing aviation battalions and one maintenance and supply battalion. Earlier these units reported directly to the commanding general of the U. S. Army Support Command Vietnam.

Then as now, the group exercises command less operational control of its attached airmobile units. This means that operational missions are performed in support of ARVN, U.S. or third country forces under direction of the major supported unit commanders. In these cases, the 12th Aviation Group monitors operational performance. Aviation units which are employed on other than specific tactical operations are allocated to agencies which require them.

The provisional group and later the 12th initially assumed command and control of the 13th, 14th, 52nd, and 145th Aviation Battalions. The 13th provides support for ARVN operations in the vital Mekong Delta area and is Army Aviation's Unit of the Year. Operations of the 14th covered the entire country, and also supported the JUSMAG operation in Thailand. The 52nd covers the rugged highland terrain in the II Corps tactical area. The 145th, the Army's original aviation battalion in Vietnam provided support to U.S. and ARVN forces in the III Corps zone. In addition, the 765th Maintenance Battalion came under control of the 12th and provided maintenance support to all four aviation battalions.

With the anticipated buildup, the 12th began a series of studies to determine suitable locations and organizational structures to provide the best possible support to U.S. and ARVN forces. Before construction of airfields in the outlying areas, units were placed in established areas generally near the large population centers. As

COL. Jones was CO of the 12th Aviation Group, APO San Francisco 96307, when he wrote this article.

troops were deployed closer to VC strongholds, aviation elements were moved into the field. Minimum facilities were available for aircraft parking, maintenance, and unit billeting. Today, with well organized planning and ingenuity, these areas are now well established sites.

New units arriving in country concentrated on attaining an early operational status. The initial period was used to conduct aviator orientations, operations with experienced units and to improve working and living conditions.

New aviators were taken in by older units and were able to get their first taste of operational flying with the veteran unit. Among the new unit arrivals in the fall of 1965 were the 10th and 11th Aviation Battalions from Fort Benning, which were added to the growing list of 12th Group units. The 10th, an airmobile UH-1 battalion supports U.S. operations in the vast II Corps tactical areas, while the 11th uses UH-1 and CH-47 aircraft. A major role for the 11th is in support of the 1st Infantry Division operations. Another new addition to the 12th was the 14th Transportation Battalion which handles maintenance requirements in the northern half of the country with the 765th Transportation Battalion continuing to service the southern half.

With an ever increasing number of aircraft arriving (from 619 in June 1965 to over 1,500 by December 1965) a vigorous safety program was initiated by the 12th Group, using the resources of the USASC Safety Section and USABAAR Technical Assistance Team. The 12th was assigned the additional responsibility for the overall safety program in Vietnam after the formation of Headquarters, U.S. Army, Vietnam and carried out this task until January 1966.

A great deal of stress was placed upon thorough in-country briefings which are given to all aviators whether they arrive individually or with units. The orientation includes terrain, weather, survival, armor protective equipment and unit operations. This orientation provides vital information to aviators to prepare them for missions in the republic.

Statistically, flying hours per month increased from 34,799 in May 1965 to 73,860 by December 1965. The results of the accident prevention program, aggressively carried out by the units, speak for themselves. Throughout FY 1965, the accident rate for the entire country was 18.8 accidents per 100,000 flying hours as compared to the worldwide average of 21.9. In comparison with FY 1964, 50.4 accidents per 100,000, the reduction in accidents amounted to a $7,800,000 savings to the taxpayers, or in terms of aircraft, the equivalent of two airmobile companies. Considering the number of hours and the type of flying performed in Vietnam, this low rate is a truly remarkable achievement.

With the amount of flying hours accumulated in Vietnam under the extreme weather conditions and with variable hours of operation, a great strain is placed upon aircraft maintenance and supply. Before formation of the 34th General Support Group (AM&S) in December 1965, the two previously mentioned maintenance battalions assigned to the 12th performed all major support to keep nearly 1,500 aircraft in top condition. The success of the Army Aviation effort here is in great measure due to the dedication and skill of maintenance personnel at all levels. Their task is made doubly difficult as major discrepancies are often corrected at night under less than desirable lighting conditions, the added harassment of unpredictable weather, and an equally unpredictable enemy. Average aircraft availability reflects their fine efforts as rates during the early months of 1966 stood at 77 percent with some units maintaining much higher levels.

The 12th Aviation Group has been closely concerned with the constant evolution of tactics and armament systems used by units today.

The use of armed helicopters in tactical operations existed only in theory and testing before employment of the armed UH-1 in Viet-

Initially facilities for parking, maintenance, etc., were scarce

nam. Early concepts concerned primarily with reconnaissance and security operations have evolved into heavy fire support systems with weapons systems such as the M-6, XM-3, and the M-5 grenade launcher. Flight tactics, out of necessity, change on a mission basis and are limited only by the commander's imagination. A relatively new tactical concept introduced in Vietnam and used by the 12th Group units is the night interdiction of river and canal traffic with armed helicopters. This tactic requires the use of a locally fabricated helicopter illumination system (HIS), popularly called "Lightning Bug." The HIS is used with an OV-1 aircraft to locate and destroy enemy river traffic and can be used in aircraft recovery operations, fire support roles, and airmobile operations.

The 12th also has been involved in the operation and development of fixed wing employment, ranging from O-1 observation and surveillance to OV-1 reconnaissance and CV-2 troop lift and logistical support. Fixed wing elements have compiled striking records in Vietnam and have performed missions heretofore thought impossible. Examples include night short strip operations using minimum lighting from vehicles or crudely fashioned flare pots to mark a landing area, regular supply of remote Special Forces units by airlanding, paradrop or LOLEX.

Fixed wing aircraft elements provide flare drop support, coordinate TAC air missions, provide medical evacuation and courier service.

As the buildup progressed into the early months of 1966, the span of 12th Group control became excessive. On 1 March 1966 the 17th Aviation Group assumed command of Army aviation elements in the I and II Corps tactical zones in the north while the 12th continued with the same role in the III and IV Corps areas. Both groups now fall under control of the 1st Aviation Brigade. The 34th General Support Group, which now controls all nonorganic aircraft maintenance units, is to be included in the brigade structure.

An XM-3/M-5 combination was tried

Also organized under the 12th Group is a provisional battalion headquarters which divides the transport fixed wing companies with the 14th Aviation Battalion in the 17th Group. Each battalion now coordinates operations over one-half of the country.

Army aircraft have to a great extent replaced the ground vehicle and provided immediate response to ground commanders through firepower, command and control, surveillance, intelligence and logistical support. Aviation personnel in Vietnam enjoy a remarkable status, not only as a result of operation success but because they continue to stress and excel in the basic characteristics of a ground combat soldier, i.e., esprit de corps, discipline, appearance, and attitude.

The future is indeed bright for the 12th Aviation Group with the continuing growth of Army aviation, evolution of tactics, uniformity of operating procedures, and a vastly improving maintenance and supply system all combining to further enhance the fortunes of the ground soldier.

The 12th today consists of the 11th, 13th, and 145th, and the Provisional Aviation Battalion, Fixed Wing. With these units and other previously assigned battalions, the 12th has displayed its versatility. With the emergence of senior U.S. combat organizations of corps size, the group now enters a new and more tactically oriented phase under the operational control of Field Forces Victor II. This new unit discharges the duties formerly assigned to the III Corps Senior Advisor with respect to ARVN operations. In addition it has operational command of all U.S. combat units in the corps tactical zone. Command of the group will remain with the Aviation Brigade.

There remains the challenge posed by the VC. One cannot tell from one day to the next what reaction will come from the enemy as the United States moves to confirm its resolution and demonstrates its commitment in Southeast Asia. Every day sees changes in tactics and techniques as the continuous quest for better methods of defeating the VC goes on. The 12th Aviation Group is part of this effort and is proud of the role it has played. It looks to the future in the full realization that its role will be even more challenging.

Flattop Delivery of Aircraft

Captain James H. Fitzgerald and Captain Charles O. Danielson

WITH DEVELOPMENT of airmobile units and air assault techniques, a means of delivering this vast amount of mobile power to any trouble spot in the world has become paramount in the minds of planners. Delivery by land, by air, by sea, or any combination of these three methods is possible.

Prime considerations and limitations in delivery by land are the location of the trouble and such geographic barriers as large bodies of water or mountainous terrain. This method used in conjunction with either air or sea delivery is a plausible solution.

Delivery by air has been and will continue to be a primary means of moving troops and equipment to meet any situation arising throughout the world. Through the use of Air Force transport planes this method is fast and effective. However, it is not without drawbacks. The main one is that a secure, established airfield must be available for landing and unloading. Another disadvantage for an airmobile unit is the time consumed and technical personnel required for disassembly (to various degrees) and loading the helicopters and then un-

CPT Fitzgerald is assigned to the Tactical Instrument Division, Dept of Rotary Wing Training, USAAVNS, Ft Rucker, Ala. CPT Danielson is assigned to Co. A, 4th Aviation Battalion, 1st Cavalry Division (Airmobile).

loading and assembling them at the destination.

The third method of delivery is by sea, an age old means perhaps overshadowed by air transportation. Two different situations can be dealt with in this type of delivery.

One situation that we are concerned with is moving troops and equipment to a port of disembarkation in a secure area. The second situation is launching an air assault from the aircraft carrier.

The first air assault unit (as such) in Army history to be deployed by sea and committed directly from the carrier was a task force comprised of Company A, 229th Assault Helicopter Battalion, and supporting elements from the 11th Air Assault Division, Fort Benning, Ga. The task force was deployed from Fort Benning to the Dominican Republic. The unit moved by its own means to the port of embarkation where it was loaded onto an aircraft carrier, the *USS Guadalcanal.* (See "Santa Domingo Operations," Sept. 65 DIGEST.)

Movement by aircraft carrier proved to be an excellent method of deployment for an airmobile unit. No special preparation was required for the helicopters. They were flown aboard and simply tied down. Disassembly is not required for shipment on the carrier, even if the aircraft are stowed in the lower hangar deck. Vehicles and other equipment were loaded with little preparation required for shipment. Disembarkation at Dominican Republic was likewise fast, easy and efficient.

Now let's take the same situation but consider the island hostile, without secure airfield or port. The answer: air assault! Air assault from a carrier that can accommodate the airmobile unit. From a carrier lying off shore an airmobile unit could be carried deep behind enemy lines to strike a strategic objective, or, if desired, to establish a beachhead to receive landing craft. Artillery can be included in the assault operation. Artillery pieces can be carried ashore by external load (or internal load in the larger type helicopter).

After the troop wave has been landed, the helicopters can return to the carrier and sling load and position on shore all equipment that is TOE to an airmobile unit. This is using UH-1B, UH-1D, CH-47 and CH-54 helicopters. A continuous aerial resupply channel can be easily maintained as long as required, delivery being to wherever needed.

The armed helicopters can perform their normal fire support role and the OH-13 its normal command, observation, radio-relay and liaison role. As soon as a field strip can be established, other aircraft can land with additional troops, supplies and equipment from more distant bases.

Consideration should also be given to using the carrier as a helicopter base. For example, a mobile base such as this may be particularly effective off the coast of Vietnam or any of the Pacific islands. A carrier base would virtually be safe from the guerrilla activity, terrorist movements, and acts of sabotage that pose a problem to a land base. It is also safer from nuclear attack. Use of the carrier's excellent navigational facilities would provide an all-weather capability to the assault unit. Facilities such as these would not normally be available on the initial assault. The carrier would also provide excellent maintenance facilities and working conditions plus good quarters and accommodations.

Once the ground units had advanced so far inland that carrier operations became out of range, the helicopter unit could debark and use their operation techniques. These mobile bases could be used as a supplement to the ground based units in a time when reinforcements are necessary to meet a particular crisis. Movement of this base could be done with a high degree of secrecy because it could remain well out to sea during any displacement. This also brings out the question of what type troops would be used for the assault force. Army troops, of course! Why not?

For future conflicts air assault from a carrier could well become a major tactical method of deployment. Let's think of the future—NOW!

The carrier is safe from guerrilla attack

Cause Undetermined

Clark C. Bohannan

CAPTAIN Joe Hampton, aviation medical officer, sighed with weariness and frustration as he kicked off his dusty boots and started unbuttoning his sweat stained fatigue jacket in preparation for a shower. It has been a long, hard day, a hot one, and mostly unproductive.

So far, the cause of the accident had not been established. The aircraft accident investigation board, accompanied by representatives of USABAAR, AVCOM, and the aircraft manufacturer, had spent the entire day at the scene of the accident. They had searched the area, discussed possible effects of wind and terrain, looked for additional witnesses, and asked detailed questions of witnesses who had been previously interviewed. Late in the afternoon, before the group left the accident site, the board president had called a conference in the shade of a big tree. None present could offer any information picked up during the day which would pinpoint or shed any light on the one factor which had initiated the chain of events leading to the tragedy.

As he continued to undress, and later while jets of warm water from the showerhead washed away

Mr. Bohannan is a retired master aviator and has been aviation safety officer for Headquarters, Eighth U. S. Army, since 1961.

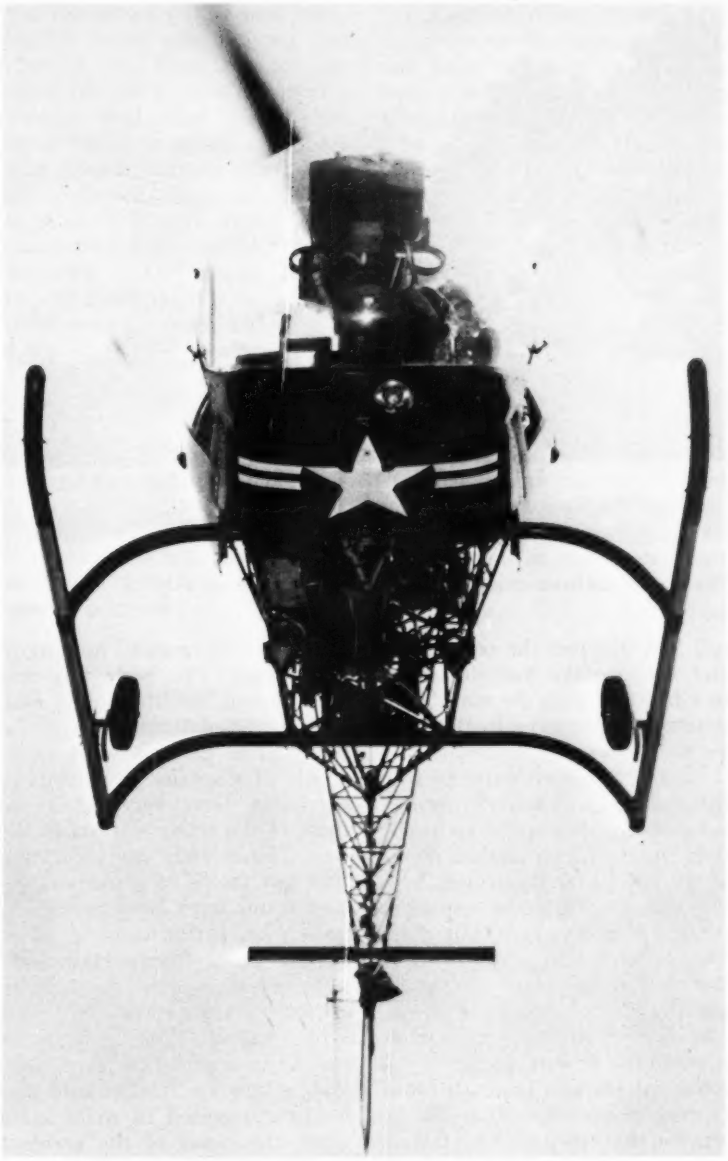
the dust and sweat and even relieved him of a portion of his burden of fatigue, Joe Hampton reviewed in his mind the accident and the course of the investigation. He mentally weighed every item of information, every possibility, and every conjecture, searching for the key factor, the human act or omission, environmental influence, or mechanical failure, which may have triggered the accident.

The call had come in at 1730, five days previously. It had come from the commander of a ground unit located 15 miles east where a highway ran along the flat, half mile wide floor of a valley flanked on both sides by steep ridges. An observation helicopter had crashed nearby. Destruction of the aircraft was total and the pilot had died instantaneously. Members of the aircraft accident investigation board, including Captain Hampton, flight surgeon assigned to the investigation, had reached the scene within an hour of the crash.

Then began the painstaking process of interviewing witnesses to establish the accident sequence and searching for, assembling, and examining piece by piece the broken fragments of the aircraft. The investigation had been thorough, though inconclusive in its results.

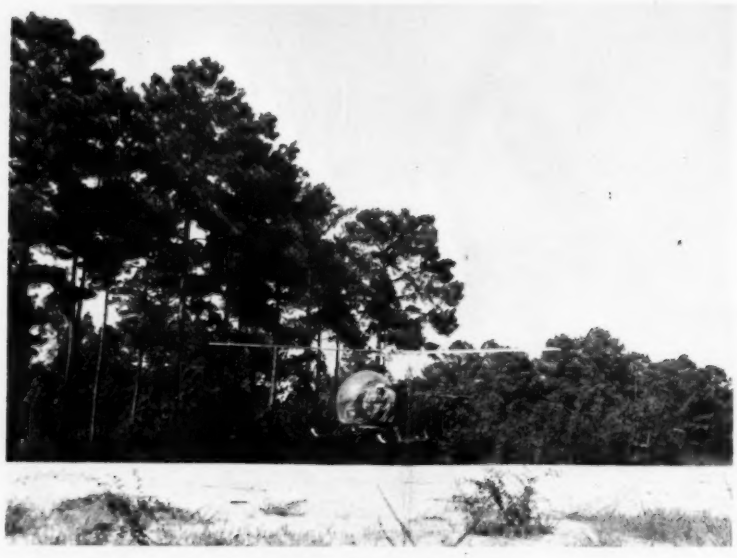
Flying at an estimated 500 feet above the valley floor, the helicopter had come into the valley from the east. Its path and speed had appeared normal; maybe a little fast, according to one witness. But winds in the valley have a lot to do with the apparent speed of passing aircraft, and it is hard for the uninitiated witness to judge either airspeed or groundspeed while observing from the ground.

Many helicopters passed over the compound every day when the weather was good, and some witnesses had paid little notice until their attention was attracted by an unusual noise and some unnatural maneuvers as the aircraft went out of control. With the aid of a hand-held model of a helicopter, witnesses who had observed the entire sequence could demonstrate the motions of the aircraft from the time its course and attitude deviated from straight and level flight until it struck the ground.



Its path and speed appeared normal to witnesses

The helicopter had fishtailed, abruptly rolled, righted itself, and rolled again, this time past the vertical. Forces imposed in the



The captain had demonstrated more than average proficiency

roll had snapped the rotor mast, and the fuselage had descended in a free fall, with the main rotor system spinning to earth 150 yards away.

Until the second extreme roll, the engine had sounded normal. It faltered as the rotor mast broke, then rose to a high pitched whine as the helicopter descended. Witness accounts varied in respect to the engine's behavior; but there was no doubt that it was running and delivering power at the beginning of the accident sequence. The flight control system was accounted for, as were main and tail rotor systems and basic airframe. It had been impossible to determine that any particular failure had been the cause of the accident —rather than one of the results.

It had been a windy day with moderate turbulence predicted by the weather forecaster. Undoubtedly, there had been turbulence in the valley. Still, other pilots had flown through, some within a few minutes of the accident. None had any particular difficulty with rough air.

An autopsy revealed nothing of significance. The body was that of a normal, healthy young man who had died from multiple injuries. The personal and social habits of Captain Jerry Wilson, the pilot, were very similar to those of the other aviators in the unit. There was no indication that any factor of a medical nature could have been present to impair his performance.

Here young Doctor Hampton's interest became more than professional; for Jerry Wilson had been a high school friend. Already he had written letters to Jerry's wife and mother. He recalled now that he had promised to write again when the cause of the accident had been found.

But what information could he give? The pilot returning solo after the completion of a normal mission; no manifestation of or reason for personal problems; no significant weather factor; an aircraft that was, as far as could be determined, airworthy up until the time the accident occurred. Then there had been a failure, a breakage somewhere; but what had broken—and why?

As he began to dress, Joe Hampton pondered his early association with the dead pilot. A popular kid in high school, smart and active, well liked; an athlete, captain of the football team in his senior year and a real driver on the football field; a real driver on the road too—man, how that Jerry Wilson did drive—should have been a race driver. It had been a little rough on his old man, though. He had had to shell out for more than one speeding ticket; and Jerry's disregard for the performance and structural limitations of an automobile had resulted in many a repair bill.

Hampton sat upright, shoe in hand. Now—run that by again. Could this be the key to the accident? Because Jerry Wilson had on more than one occasion goaded an automobile to the point of damage and danger, could it reasonably be conjectured that he would disregard airspeed and rpm red lines on an aircraft and deliberately operate in the zone where the manufacturer cautioned that failure may occur?

Joe Hampton knew enough about the aircraft operated by the unit to know that red-line airspeeds could easily be exceeded in the new type helicopters recently assigned. The airframe was basically the same as that of the older models but the engine would deliver almost 25 percent more power. This had been hailed as a feature which would materially increase operational safety. It would permit the helicopter to hover out of ground effect at maximum gross weight in just about any density altitude condition likely to be encountered in the area, and would allow it to operate under normal sea level conditions with a respectable reserve of power. But this same power reserve could be a hazard if it were mishandled. Like a big

souped-up engine in a light racing car, it could drive the helicopter far faster than its red-lined airspeed, particularly at low altitude and with a light load.

Had Jerry Wilson, heading back to the field in a lightly loaded helicopter at the end of the duty day, become impatient with recommended airspeeds and wrapped in an excess of that reserve power? Had he allowed the airspeed indicator to swing right on past the red line, reassured and easy in the thought "It won't happen, not this time, and not to me"?

He realized this might prove to be a blind lead just as so many other possibilities had been investigated and eliminated, but it would have to be checked out. Wearily, he pulled on a pair of slacks and headed for the pilots' lounge. Likely, he would find one or more of the instructor pilots or the standardization pilot there. He could start with them.

Interviews with IPs and the standardization pilot were not enlightening. Captain Jerry Wilson demonstrated more than average proficiency in his standardization training and on his checkrides. There was no question that he could handle the aircraft as well as or better than other aviators with comparable experience. No, he had not failed to observe the limitations of the aircraft; rather, he had followed approved procedures more closely than the average aviator. But, thought Captain Hampton, he had also observed speed limits on the highway when under supervision of some kind or if he suspected a patrol car or motorcycle cop might be lying in wait. He had scared the hell out of Joe Hampton a time or two under other circumstances however.

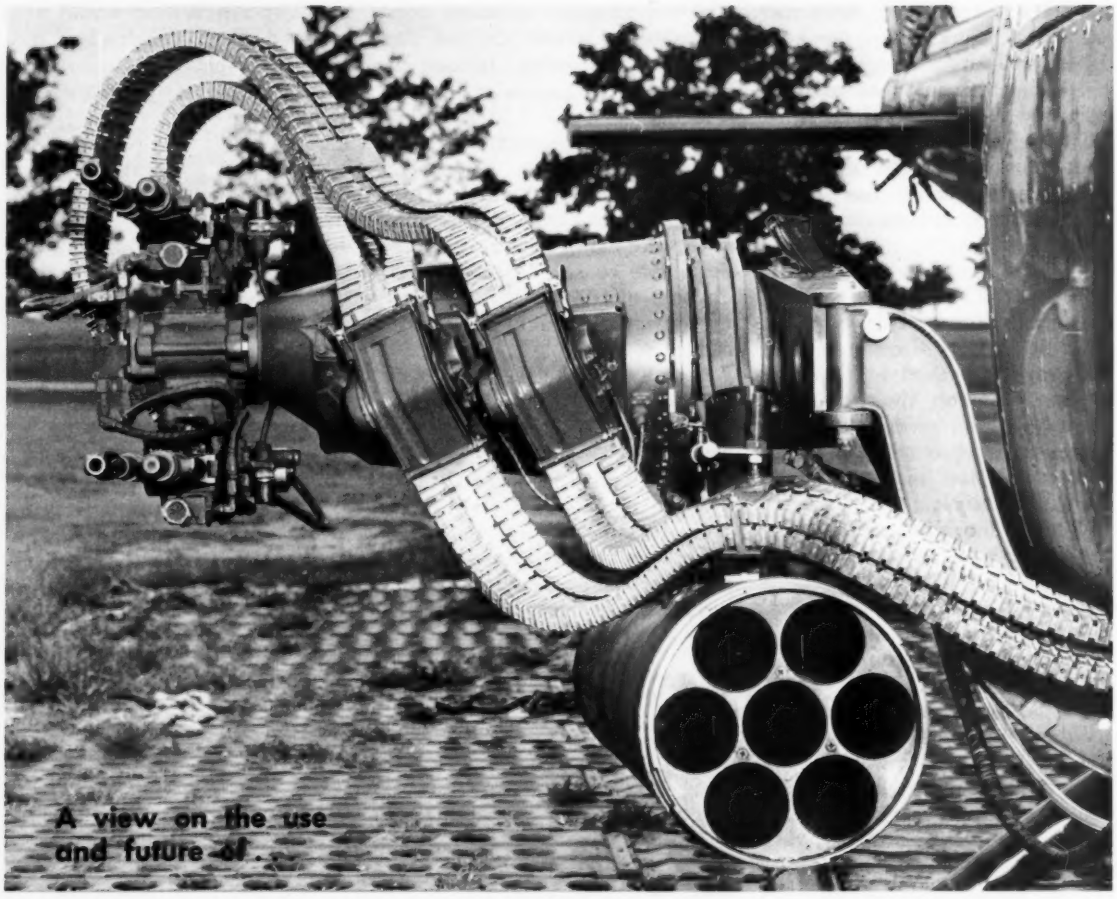
Discussion with other officers and men who had worked and flown with Jerry Wilson revealed a little more. It had been noted that the airspeed indicator occasionally swung past the red line when he was flying. In one instance another aviator riding as a passenger had asked him to slow down. The most significant report came from a warrant officer who had followed Captain Wilson home on a 50 mile flight when both were flying solo. He had not been able to keep up at normal cruising speed, and Wilson's helicopter was soon out of sight ahead of him.

Hampton presented his facts and opinions to the board at the next meeting. The other members weighed the information he had gathered and considered it possible that the accident might have been due to excessive airspeed at the moment the helicopter entered an area of turbulence. But they were not convinced. They felt that Captain Wilson would have matured since his high school days and were reluctant to conclude that he had deliberately flown the helicopter over the red-lined speed.

So it was that Captain Joe Hampton, Flight Surgeon, signed his name to a report which listed the cause of the accident as undetermined. However, in his part of the report he had stated his opinion that there was a strong possibility that excessive airspeed was the cause. In his own mind, he considered it most probable.

He reflected as he left that last meeting of the aircraft accident investigation board that quite possibly many aircraft accidents listed as "cause undetermined" were due to disregard of those warning red lines placed in the instrument panel by the manufacturers of the aircraft.

It's a smooth road, but don't forget the instruments



A view on the use and future of . . .

ARMED HELICOPTERS

Major B. A. Brown

IMAGINE WHAT difficulties our ground forces in Vietnam would experience without armed helicopters to provide protective escort for vertical envelopment forces airlifted by cargo helicopters. Without regard to time or place, whenever the need arises the use of airmobile forces has enabled our armed forces to introduce a deterrent force whenever and wherever needed.

Four years ago, when Vietnam was just another Southeast Asian country with problems that were little known and little mentioned, the true birth and acceptance of armed helicopters was taking place. At that time, after several years of struggling to sell the concept of the air cavalry troop and the associated use of machineguns and rockets on helicopters, the ideal ground on which to try these concepts presented itself in a small war torn country.

The first helicopter units to see action in Vietnam soon realized that effective protection against small arms fire was not being pro-

vided for their helicopters. Faster fixed wing aircraft could accomplish certain escort missions, and prestrike of landing zones in assault missions was accomplished up to a point. But from that point, the slow flying CH-21 was left an easy target for any guerrilla smart enough to stay down in his hole and wait out the arrival of the cargo flight in the landing zone. To counter this, machineguns were mounted in the doors of CH-21s, and on the nose of some of the aircraft, to allow the formerly defenseless helicopter to fight back when fired on.

This was found to be less than satisfactory for several reasons. The landing formations had a period after the prestrike was over and before their arrival in the landing zone during which the Viet Cong could move in and place fire on the helicopters. The CH-21 was not versatile, fast or maneuverable enough for an escort mission even when armed with rockets and machineguns.

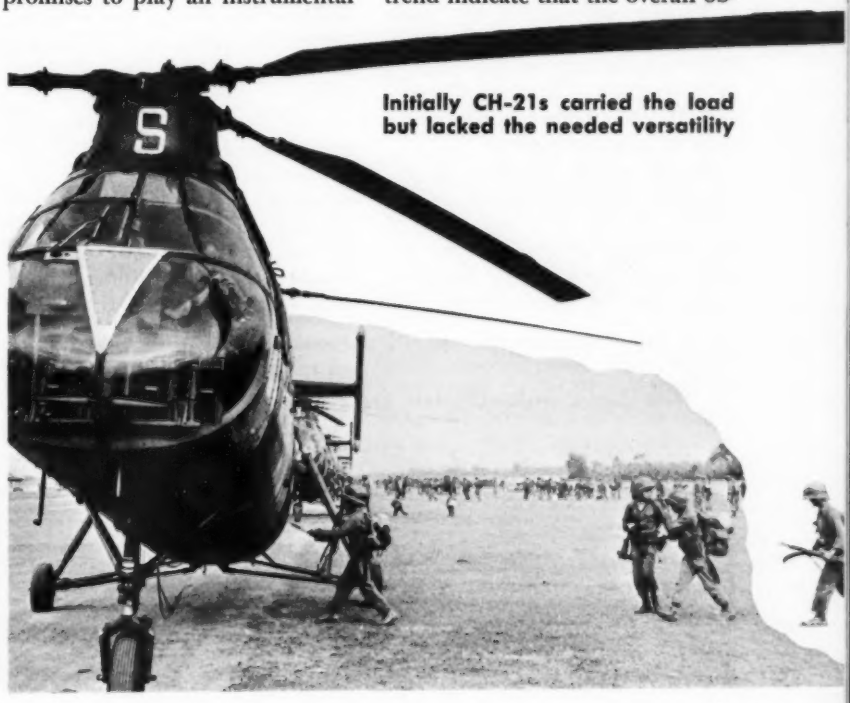
The first armed helicopter unit organized and assigned the mission of escorting cargo helicopters in Vietnam was the Utility Tactical Transport Helicopter Company, which was moved to Vietnam in 1962. The UTT Helicopter Company (now the 197th Airmobile Company) was provided UH-1A helicopters armed with XM-2 machineguns. By late 1962 the UH-1A was replaced by the UH-1B armed with XM-6 quad machineguns and 16 "jury-rigged" 2.75 inch aerial rockets.

Throughout 1963 the UTT was used as a test unit for the Army to determine the effectiveness of armed helicopters. It was demonstrated that armed helicopters employing the tactics and techniques developed by the UTT could provide adequate protection for airmobile operations against an insurgent force. The one armed unit was soon providing cover and protection on a daily basis. It was so successful that other cargo helicopter units arriving in Vietnam were organized with one armed platoon to perform their own escort duties. The number of armed helicopter platoons has increased from the original three platoons in the UTT. The role of the armed helicopters has rapidly expanded as the United States commitment in Vietnam has grown from several hundred troops in 1961 to over 300,000 in 1966.

As improved weapons systems and changing tactics have allowed an ever greater part to be played by helicopters in the fight against the Viet Cong, the mission of the armed helicopter has changed. With emphasis on vertical envelopment in the limited war situation, mobility and firepower provided by the armed helicopter promises to play an instrumental part in the overall objectives of the U. S. Army in Vietnam. Although some heavy armored vehicles have been used in fighting in Vietnam, conditions there appear to de-emphasize active use of armor in a small, limited action war. If, however, the enemy should acquire this type weapon as part of the threat against our troops, air-to-ground missiles such as the M-22 rocket system and, in the future, use of the TOW as part of the Advanced Aerial Fire Support System should remove these as a serious threat to our air-landed forces.

FUTURE WARS AND LIMITED ACTIONS

What is the military significance of winning at all costs through an all-out war versus a more realistic trend to attain the goal through meeting over the conference table after having fought a long drawn out, limited action war? Doesn't the seeming trend indicate that the overall ob-



Initially CH-21s carried the load but lacked the needed versatility

MAJ Brown is Rotary Wing Branch Chief with the Employment Division, Dept of Tactics, USAAVNS, Ft Rucker, Ala.

jectives of the Communist powers are more likely to be attempted through fighting limited action wars? If this is the case, if we are to be prepared to meet a new enemy on any one of many different fronts, the lessons learned from the past few years in Vietnam point up a definite requirement for more and better armed helicopters.

In the development of tactics, hardware and logistics support practices, is a real trend set or established in 1, 10 or even 20 years? After World War II, the approach was to develop weapons with more speed, bigger bombs (100 megaton H bomb), heavier armament, and more lethal weapons as a deterrent to another war and as an answer to fight any or all wars if this step had to be taken. This could have been a "hard rut to get out of," had not the lessons learned in Vietnam pointed out the fallacy of this approach.

Against conventional targets in a limited war where no front exists for more than a few hours, older weapons systems have proved in many cases to be more effective and much cheaper than many modern weapons systems.

Slower speeds required to accomplish the escort mission of airmobile forces have necessitated the makeshift arming of some aircraft never intended for that purpose. Now in development, the Army proposes to adopt the Advanced Aerial Fire Support System, better known as AAFSS. This will meet foreseeable requirements to escort airmobile forces and otherwise provide an excellent deterrent against any future limited actions such as we have in Vietnam today.

FUTURE USE OF ARMED HELICOPTERS

Large, long, drawn out wars with many countries involved may be a thing of the past. In today's world, involvement of the United States is basically in the protectorate sense, to halt or prevent the takeover of a country by Communist powers.

If, however, an outbreak should escalate and involve the use of tactical nuclear weapons it will become essential to commit smaller tactical units, on short notice by aerial delivery means. This in turn calls for additional use of a protective force to cover this airmobile type offense-defense. Establishment of a static front or defensive situation will be highly unlikely in this nuclear environment.

This is the only unfavorable type action in which limited use of armed helicopters in a rear area defense role will not materially effect the balance of forces or win battles. It will, however, make possible the establishment of a small-sized counterattack force which can cover a large area effectively, day or night. In a highly fluid battlefront in which a fast moving retrograde action or a rapid movement during exploitation and pursuit is undertaken, armed helicopters in support of ground units in close contact with the enemy can favorably influence the balance of forces. This is possible through the greater variety of weapons systems available and their ability to provide protection to the vulnerable rear and flanks of extensively scattered friendly units.

Anyone who doesn't believe that the armed helicopter can survive in a sophisticated weapons environment will shoot this line of thought full of holes. The answer is that tactics can be developed which will allow the armed helicopter to live when ground-to-air radar guided missiles are present. In a fluid battlefront area, radar installations will be difficult if not impossible for the enemy to deploy well forward near the FEBA. In addition the helicopter can stay below most of the acquisition radar and will be a difficult and questionable target at best. In any future war or engagement, the ready availability of this type weapons system, the armed helicopter, will make the job of our Army easier, safer and faster. That job is to take and hold ground or deny its use to the enemy.

New tactics and equipment are evolving

ON THE WAY, WAIT

Lieutenant Myron K. Nelson, Jr.

ARTILLERY CAN be adjusted from almost any aerial platform, but where should this platform be? This question has bothered many aviators and artillerymen. To try to find the answer, two positions were evaluated to see where the aerial platform should be located while adjusting artillery. These two positions were: close to the front lines (under the trajectory), and behind the artillery position.

Two fixed-wing students who had just completed artillery instruction at Fort Rucker were used in the experiment. Student pilots with no previous artillery experience were used to determine if they could remain oriented while going through evasive maneuvers. A UH-1A was first flown under the trajectory and 2,000 meters in front of the artillery position.

From this position, it was necessary to fire the artillery at the command of the pilot. The pilot received a time of flight for 2,000 meters as well as a time of flight to the target. This information enabled him to wait until the projectile passed overhead before starting a climb to altitude. Also, he was able to judge when the round would hit the objective area. Therefore, the pilot could plan to be at the required altitude to observe when the rounds hit in the vicinity of the target. After the observer saw the round hit, the pilot went immediately into autorotation. This kept the aircraft exposed to the enemy a minimum amount of time. At this time the observer would send his subsequent fire request.

Student pilots were able to fire the missions without becoming disoriented. A normal mission took between 6-10 minutes, adjusting between 5-7 rounds. The helicopter remained exposed to enemy fire not more than 20 seconds for each round fired. This would not give the enemy much time to react, aim, and fire at the Huey.

This position gives the commanders quick, positive results of action requested. Also, the air observer will have direct liaison with front line commanders and can immediately report any observations that would normally need to be relayed through the artillery unit.

However, this position has disadvantages. The main one is that the aircraft is vulnerable to heat-seeking rockets and other antiaircraft weapons. Another disadvantage is that constant coordination must be kept with the ground forces to prevent the aerial platform from being shot down by friendly forces.

For the second evaluation, the Huey was flown behind the artillery positions, at a range of 8,000 meters from the target area. The pilot hovered the Huey at 1,500 feet, which enabled the observer to use field glasses while adjusting the fire. If the observer had used glasses while the helicopter was in motion, he would have become nauseated in a short time. Adjusting artillery from this position is the same as adjusting from a mountain observation post except for the added advantage of maneuverability.

Main advantage of this position is that because of the distance from the front lines, the enemy will not be able to use his antiaircraft weapons effectively. From

this position, the air observer will be able to furnish a more constant observation of the enemy. However, because of the distance involved, the observer would not be able to see as much and would have to use field glasses.

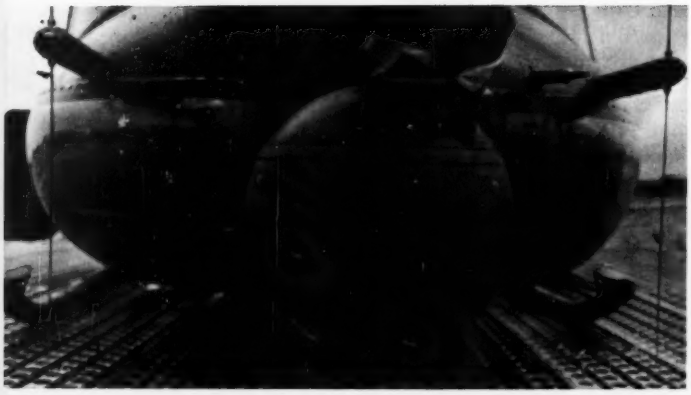
After the experiment was completed and the advantages and disadvantages of each position evaluated, use of the aerial platform close to the front lines was chosen as the more desirable of the two positions. However, if antiaircraft fire has been developed by the enemy to the point where an aerial observer cannot remain in proximity to the front lines, the observer will need to shift to the other position, behind the artillery position.

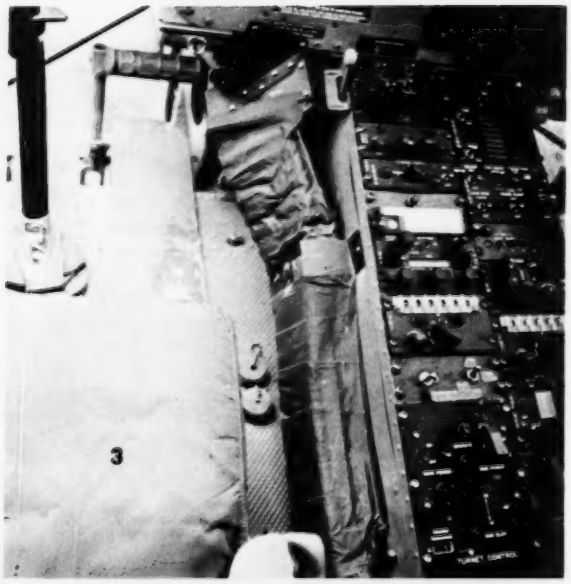
Today, because of highly developed antiaircraft weapons, slow aircraft cannot remain at high altitudes close enough to the front lines to be effective. Now, coordination will have to be established with infantry and artillery units so that observation aircraft can fly, with a certain amount of safety, under the trajectory of artillery and in proximity to the infantry.

LT Nelson was with the Special Subjects Branch, Special Subjects Division, Dept of Tactics, USAAVNS, Ft Rucker, Ala., when this article was written.

Helpful Hints on the A

Lieutenant Colonel Arlen R. Suddaby





THE 40 MM GRENADE launcher has proved to be an effective weapon in Vietnam due to the extensive fragmentation of the M384 projectile and the number of rounds that can be carried aboard the armed helicopter. Of course there are a few shortcomings, such as the low muzzle velocity of the launcher and absence of a tracer/marking projectile, but these will soon be corrected.

A major problem manifests itself when making a gun run in the face of Viet Cong fire and the 40 mm grenade launcher fails to fire. At this crucial moment the normal operator outcry has been, "This —— —— system won't work!" Actually, in the vast majority of cases, the malfunction was traced to improper maintenance or operation of the weapon. Units in Vietnam have achieved virtually trouble free operation once they discovered the do's and don'ts of maintaining and operating the subsystem.

As it is impossible to correct many subsystem malfunctions while airborne, the following helpful hints are submitted so you won't find yourself looking down the muzzle of a VC machinegun with nothing at the end of your trigger finger but a metallic click.

Starting from the front of the aircraft (photo 1), it is common practice to depress the muzzle of the launcher when the aircraft is on the ground. This is a sound precaution, as in this position the projectile will not detonate if inadvertently fired. However, *the muzzle should be elevated to the level position during preflight* to keep it from contacting the ground during takeoff. A launcher muzzle full of mud has very little effect on the VC.

In keeping with Murphy's Law, the front enclosure of the turret assembly can be fastened improperly (photo 2). When this occurs, the lateral traverse of the launcher is limited to a very few degrees. Therefore, *during preflight, move the muzzle by hand to ensure full lateral and vertical traverse.*

Moving inside the helicopter, you may find that a cover has not been provided for the ammunition feed chuting. *This chuting must be covered with*

ne M-5 Grenade Launcher

LTC Suddaby was the Employment Division Chief for the Dept of Tactics, USAAVNS, Ft Rucker, Ala., when this article was written and has since left for an overseas assignment.

canvas or green tape as shell casings and ammunition links from the door gunner's M-60 machinegun become lodged between the sides of the chuting and the M384 projectile (photo 3). Correction of this stoppage is difficult and time consuming.

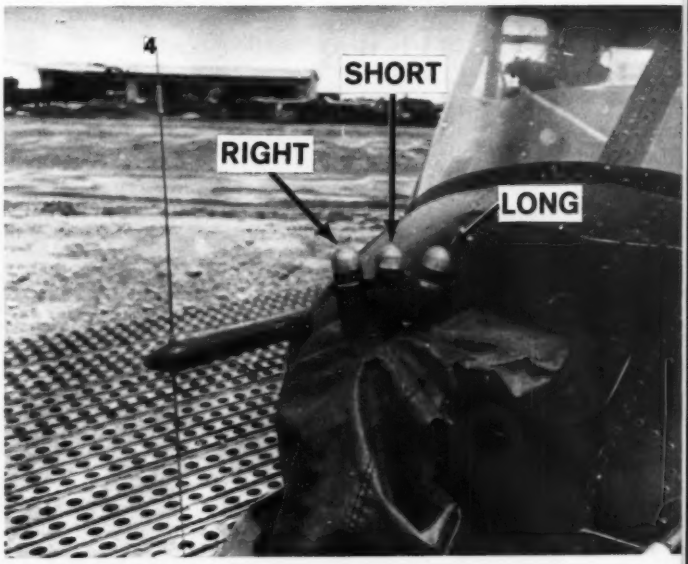
The most frequent cause of subsystem malfunction is ammunition handling (photo 4). Size and weight of the cartridge coupled with the fact that the link must be easily stripped from the projectile produces a situation where improper ammunition handling can easily produce long or short rounds that jam in the ammunition feed chute assembly.

During early field tests of the M-5 subsystem, a few stoppages were attributed to improper factory linking of the cartridges. Therefore, units began to lay out the 50-round belt and inspect each cartridge before loading. This practice proved disastrous as the resultant excessive ammunition handling more than tripled the number of malfunctions previously encountered.

Units subsequently discovered that the best solution was to load the ammunition chute and ammunition box directly from the packing case, making a visual inspection of each cartridge for proper linkage. Since then, quality control at the factory has improved and eliminated the requirement for a close visual inspection of each cartridge (photo 5).

Assuming that the ammunition handling problem was solved, we turned our attention to other areas only to find that malfunctions were still occurring. The cause, again, was excessive ammunition handling, but fortunately the solution was simple. Operators were attempting to load ammunition directly from the packing case but were opening the wrong end of the packing case about 50 percent of the time. When this occurred, they would remove the belt from the box, switch ends, then begin to load. The result was long or short rounds due to excessive handling. Solution: *when loading the ammunition chute, open the top of the packing case; when loading the ammunition box, open the bottom of the packing case.*

Finally, use of the issued linker-delinker was found to be time consuming, and it was often difficult to properly position the cartridge with this tool.



One efficient crewchief discovered the solution—*use needle-nose pliers.* By using pliers, he could quickly fasten or unfasten links and it became unnecessary to delink any of the cartridges from the belt.

This article does not pertain to all aviators, will not revolutionize armed warfare, and it is not a "cure all" for the M-5 subsystem. It is submitted for the few who fly with the 40 mm grenade launcher and know that continual functioning of the weapon is a prerequisite to longevity.

It is not always easy to balance the scales between safety and training regulations

Man in a Squeeze

Captain Gary V. Dennison

THE ARMY Aviator today is a man squeezed between training requirements and safety regulations. He barely has room to turn around, and his only real relief is the freedom of a combat zone where he trades his old problems for the more basic ones involving life and death and the successful support of a combat mission.

Army aviation is growing at a phenomenal rate. Tactical support is no longer a textbook ideal but a practical reality. Where we once had lip service we now have actual tactical flying, and Bozo the Clown acts have been replaced by nap-of-the-earth training.

Aviators, for the most part, have responded to this change enthusiastically. First, because it is something they were taught in flight training and were seldom able to do because of local restrictions, and second, and most important, they realize that it more nearly parallels the type of flying they will do in combat.

This sounds good, so where's the rub? What is happening? Why, in some cases, is this tactical training kept to a minimum?

The answer is simple and con-

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Poor regulations can hurt training

sists of two parts: one, the intent of training regulations is being restricted by field commanders in an effort to hold down aircraft accidents; two, aviators are being punished as a means of accident prevention, i.e., a positive approach to accident prevention has taken a negative slant.

One regulation issued in January 1965 by an overseas command, for example, prohibits helicopters from landing at ANY location that has not been previously marked by aviation ground personnel. No battalion commander can, therefore, fly to visit any of his units in the field unless the aviation section commander first sends his crewchiefs to the company location by vehicle and marks a pad. In a fast moving tactical problem this soon becomes impossible.

The aviator is then put into the position of saying, "Yes, sir, that's A Company but I can't land there." Most officers faced with this problem say to blazes with it and, after the proper recon, land anyway. The point is, that a regulation, right or wrong, has been violated, and should something unfortunate happen this officer will pay the penalty.

The second part of the squeeze comes when aviators are suspended automatically any time an accident or incident occurs. One Army area now makes this mandatory in all cases. If the accident/incident in any way involves supervisory error, poor judgment, or violation of any regulation, the aviator is then exposed to a separate investigation under the provisions of AR 15-6. During this time, and it has no connection in any way with the accident board, the aviator remains grounded, bearing a stigma which he may or may not deserve. The separate investigation, once completed and approved, will result in his possible return to flight status, with or without loss of flight pay, depending upon how it is written or it may result in a flight evaluation board. In the meantime he and his fellow aviators live in dread wondering who will be next, and the unit is short another aviator which it can ill afford.

Before receipt of this grounding directive, one aviation company was well known for its aggressive, fast moving training record. It was routine to shoot power approaches to the sod adjacent to the hard surface runway at the home field. Helicopter pilots invariably terminated their flights with power recovery autorotations. A dry-run helicopter gunnery course was set up next to the airfield, and pilots asked the unit IP to run through the course with them many times, particularly on days when weather precluded cross-country missions. Barriers were set up for fixed wing aviators, and even the night lighting set was dragged out and set up on the small sod runway once in awhile.

In short, the unit was doing tactical training every chance it got. Then, all at once, regulations issued by a higher headquarters made the helicopter, in effect, no more useful than a fixed wing aircraft. It was decided that if your destination wasn't listed in the Jeppesen then you just didn't go. A few weeks later they were told that grounding was automatic in case of an incident unless it was clearly an act of God or an obvious materiel failure.

They looked around, unbelievingly, and watched aviator after aviator get his wings clipped. Then it happened to them. The commander's power of suspension turned into a disciplinary action resulting in a loss of flight pay. Their attitude abruptly changed. "Play it Safe" and "We might as well forget about trying to support anyone" became common subjects of talk. Two wavering career types decided to try their lot with the civilian end of flying. The safety officer became disgusted and then discouraged as he saw attitudes crumble and non-

Landings on the sod are practiced

Safety, Training, and Common Sense

rated personnel point accusing fingers at his once enthused, eager aviators.

Changes to the regulations were discussed, but there was no real action and aviators were told that the accident rate was too high and more restrictions would certainly follow. In a few weeks new pilots in the unit, never having done a touchdown autorotation because of safety requirements, were flying low level missions in an area noted for its bad weather. They, too, felt the frustration present in the unit. The unit went to pot. In a situation like this, what can be done? How can one aviator, or even a group of aviators, correct these problems?

The answer is not a simple one. Much is involved and a great deal of understanding and maturity is required. First, we have to remind ourselves that regulations are not just dreamed up by bored staff officers on rainy days. Much thinking, planning and staffing take place before restrictions are applied to aviation, and these restrictions usually occur after abuses have been observed.

Statistics are a fact of life we have to live with in a modern complex Army, and statistically Army aviation has not always come out looking well. By the increased cost of aircraft accidents we have created a situation wherein nonrated personnel have been forced into taking corrective action, though they themselves realized it would be better for aviation matters to be solved by aviation personnel.

What would you do as a senior officer when all normal efforts to reduce accidents have failed? By necessity you would resort to abnormal or drastic measures. This is understandable. We must do everything in our power at the lowest levels to reduce accidents; and, if restrictions come, we should try to understand the reasons they come and do the best job we can within the newly established rules.

When normal mission support or increased training requirements are hampered severely by restrictive regulations we must take immediate action through command channels to make our superiors aware that they have, perhaps unintentionally, created impossible, or at least impractical, situations.

In case of the unit just mentioned, the officers concerned gathered data and presented facts to their immediate, nonrated, commander. He saw the problem and went to bat for them. Because the facts were correct, action was initiated which eventually (paperwork is slow—no one can deny that) led to rescinding a particularly binding aviation regulation. In the meantime, he instructed his aviators to follow regulations to the letter even though he, too, felt that restrictions were not appropriate to good aviation support.

When this commander discussed these problems in an open meeting with all aviators a cohesiveness that had been slipping away again became apparent. Steps were initiated to train under tactical conditions with a maximum of safety and common sense. Those areas where restrictive regulations applied were carefully scrutinized and substitute training, if appropriate, was done. Education of the supported troops was begun and everyone, once they realized the problems, was behind their aviation unit 100 percent.

A serious problem of morale became a slight source of irritation and in time was almost forgotten. The end result was interest, alertness and attention to regulations, higher motivation and, surprisingly, the realization that more problems would soon come. For aviation is a growing vital element of our expanding Army. There will be problems in the maturing process, but by foreseeing areas of possible contention and by doing something about them as they occur we can grow with fewer pains.

Low level flights are practiced frequently

The Professional NCO

SGM. Glenn E. Owens

FOR MORE THAN 21 years, our country has been on continuous alert, prepared for an attack that may come at any moment. This state of semi-emergency is magnified many times in the Republic of Vietnam.

The United States Army, and particularly Army aviation, has no place for a noncommissioned officer who is self-centered, apathetic, or incompetent. We cannot afford second-rate leaders. If we are needed in a hurry, our reaction time as individuals and as units becomes of paramount importance.

As noncommissioned officers we have two major duties: the morale, welfare, and safety of those soldiers under our supervision; and an absolute, unquestioned loyalty to our superiors.

When we were appointed to our present grade, we became enlisted commanders by written order, a leader by implication. You are not, and cannot be, appointed a leader by written order. *No one can make you a leader of men except yourself.* There is a vast gap between command and leadership. Command is a legal status that may be conferred upon anyone. The official who grants the right to command may also take it away. In either case, all that is needed is a paper composed as the law requires and bearing the appropriate signature. Battles have been won by troops who were well commanded although poorly led, but no such army ever won a war.

No law, title, star, or chevron can create a leader. Leadership grows and develops within the man only by constant effort on his part. It is a quality that may be found in a private or a general. No army has ever been victorious that did not possess noncommissioned officers who were skilled and courageous leaders. No matter how brilliant the officer, he cannot but fail in the end if the men who work and fight for him are not led by competent noncommissioned officers.

In the history book that tells of wars and battles, few noncommissioned officers are mentioned by name, and public glory goes to the generals. But these same generals are the first to credit victories and success to the noncommissioned officers who were leaders on the battlefield. Napoleon became an emperor; yet the title he most proudly bore was one conferred by his men: The Little Corporal.

The manner in which an order is given marks the difference between a noncommissioned officer who leads and one who merely commands. The latter wants to cover up his own shortcomings by being needlessly gruff and arbitrary, and every order he gives has an unspoken "do it or else" tacked on it. He may also be a nice guy and slightly apologetic when he tells his men to do something. This individual is afraid he won't be liked.

A noncommissioned officer's manner must at all times be firm and impartial. His instructions must be clear, concise, and directly to the point, and it will never be necessary to remind his soldiers that his orders must be carried out. However, he must never pass up the opportunity to explain in detail why a given task is necessary.

The American soldier obeys more willingly if he knows why an order is given. The noncommissioned officer will get a much better response if he explains why the order is necessary rather than avoiding responsibility by passing it off as "it's not my idea" or using words to that effect.

If he is to enjoy the privileges to which he is entitled, a leader must establish his position as one of firmness and impartiality. He must also live up to those responsibilities inherent to his position. He must establish and maintain personal contact with his subordinates, and make them feel that he is available at all times to assist in any way possible. In this way, and this way only, can he assure himself that all complaints and gripes reach him first.

A sergeant should be available at any time, day or night, to the men placed under his supervision, and should always leave no stone unturned to assist his men in any way possible. However, he should never deny any man the right to see his commander, if the individual requests to do so.

Remember, when you were promoted to your present rank you were also promoted in your responsibility. You will never go wrong by seeing the other man's point of view, or listening to his problem, and assisting him in anyway possible.

Each leader of men should become completely familiar with two words: "compassion" and "humility." Always endeavor to make them more than just words; make them a part of your personality.

Keep your men informed at all times. Tell them the why as well as the how. Support and protect them, and they will do the same for you. The measure of an effective leader is the result of the unit's performance.

SGM Owens is the Chief Instructor with the Dept of Maintenance, USAAVNS, Ft Rucker, Ala.

U. S. Army Aviation Test Activity

Major Joseph E. Kramer

At the time he wrote the article, MAJ Kramer was Plans and Operations Officer, U. S. Army Test Activity, Edwards AFB, Calif.

WHEN IT BECAME necessary to establish an engineering test center for the Air Force, Edwards AFB in California was selected because of its location. It was close to many of the big aircraft manufacturers and offered a variety of terrain and environmental features important in testing aircraft.

Gradually, large hangars and expensive test equipment have been built at the base, lessening the dependency on natural features. Today, Edwards is one of the most important aeronautical test centers in the United States.

For a long time the Air Force or Navy tested all of the Army's aircraft. Originally most Army aircraft were light liaison types and off-the-shelf models, and the Army's aircraft needs were few and simple. But when new type aircraft especially designed for airmobile concepts came into being, the workload on the other forces became too heavy and the Army had to establish its own test activity.

Edwards was selected as the home for this new test unit because the Army also wanted the terrain and location features available there. In addition, the Army could use much of the Air Force's equipment, thus saving the taxpayer money.

The U. S. Army Aviation Test Activity (USAAVNTA) is doing all of the Army's aviation engineering testing. All air items proposed for Army use receive engineering tests to make sure they can do what the Army wishes. Performing these tests is the main mission of USAAVNTA.

In addition, the activity also conducts tests needed to accumulate handbook data used in -10s. Some of this information is gathered while engineering tests are being run, but often it is necessary to make special tests.

Sometimes the activity produces the handbook data in its entirety; at other times the contractor does

The Fleep is inspected before a test flight

the work. When it's done by the contractor, USAAVNTA information is used as a check.

In testing aircraft for handbook information, all tests are conducted within a controlled environment, i.e., no-wind conditions, specific altitudes, measured gross weights, and center of gravity extremes. The data is converted to standard altitude and temperature conditions and forwarded to the contractor for review. It is next sent to the U. S. Army Aviation Materiel Command for publication.

The most important tests are takeoff and landing distances at various airport elevations, fuel flow at various speeds, altitudes and gross weights, service ceilings, optimum climb and cruise speeds, maximum airspeeds, and hovering capabilities. Also important are tests to determine the stability and controllability of the primary and trim controls, both in the steady state and maneuvering flight.

Each test aircraft is highly instrumented with sensitive precision instruments which transmit the data obtained to oscillograph or photo panel recorders. By using this method, the human-error factors and pilot opinions are markedly reduced, although pilot comments are not disregarded and do affect the eventual outcome of the final report.

Four new aircraft are currently under test. The XC-142, X-19, and X-22 are tilt-wings under the Tri-Service V/STOL test team, a special group set up to handle these type aircraft for the Army, Navy, and Air Force. The other aircraft under test is the XV-5A—an all Army V/STOL effort.

Other USAAVNTA projects include testing of the new model 540 rotor system on an armed UH-1B and a test of an unarmed UH-1B with the 540 rotor for handbook data.

Two OH-6s are currently under test. One is being used in a desert test and the other to gather handbook data.

Later this year more aircraft are slated to arrive for testing. One is a UH-1D with standard rotors but equipped with the new T53-L-13 1,400 hp engine. Another will be a UH-1B with the L-13 engine and model 540 rotors. A production model of the OH-6 will soon be delivered to undergo six different tests and an XV-8A Fleep is expected momentarily to start its tests.

Aircraft that can be expected sometime in the near future are the Advanced Aerial Fire Support System (AAFSS), high gross weight CH-47, and the counter-insurgency aircraft (COIN).

USAAVNTA test pilots are graduates of either the Navy or Air Force test pilot schools. They receive instruction in all phases of engineering flight tests for both fixed and rotary wings, conventional and jet propulsion. One of the test pilots is a graduate of the Empire Test Pilot School of England.

Flight test engineers are graduate aeronautical engineers and are recruited from aircraft contractors or engineering colleges.

Maintenance and instrumentation personnel are authorized to perform limited third echelon maintenance and are capable of making modifications when needed in installing instruments.

LIEUTENANT BY-THE-BOOK

Captain Gilbert M. F. Brauch, Jr.

IT WAS A beautiful day for flying as Lieutenant By-the-Book looked out the window of his BOQ room. He wondered what kind of mission the operations officer would dream up for him today. Immediately he resigned himself to the strong probability that he would get the weekly "milk run" to Fort Out-in-the-Sticks instead of that glamorous VIP flight to Metropolis. Since he has been accustomed to doing things "by the book" since flight school, he was careful to eat a good breakfast before reporting in for his mission of the day.

As the lieutenant suspected, he was assigned the routine mission to Fort Out-in-the-Sticks. Undismayed, he began flight planning. Even though he had flown the route many times he was still careful to plot his course, figure the winds, accurately compute the weight and balance, and carry out all of the items included in thorough preflight planning. Preflight inspection of his favorite ship, U-1A 583, was a sight to put fear into the hearts of both his crew-chief and the maintenance officer. He poked his nose into every nook and cranny of the aircraft,

A nylon letdown

thoroughly inspecting every detail of the ship to ensure proper operation and functioning.

The crewchief stood by with baited breath awaiting the inevitable question, "Are you sure that you drained the breather box?" After relieving the crewchief's tensions with a cheery "OK, let's light the fire!" Lieutenant By-the-Book climbed into his UGLY—1 ALPHA pulled out his checklist, and began the prestart checkoff.

As can easily be imagined from the description of his previous activities, Lieutenant By-the-Book's procedures for takeoff and climbout were a model of professionalism to make his flight instructor's chest swell with pride. He was not a mechanical pilot, nor did he have the innate ability to strap on an aircraft and make it sit up and speak. But he was careful and extremely proficient.

He knew his emergency procedures with flawless precision and was generally considered the safest pilot in the detachment. Consequently, when his propeller suddenly went into uncontrollable overspeed condition he knew instinctively that paragraph 4-19, section III, chapter 4 of TM 55-1510-205-10 (June 1965) states that:

"If propeller failure is due to oil supply breakdown proceed as follows:

a. Propeller lever — RETARD

b. Throttle — ADJUST TO REDUCE AIRSPEED TO 60 KNOTS IAS

c. Wing flaps — TAKEOFF

d. Oil pressure gauge — CHECK CONSTANTLY

e. Land — AS SOON AS PRACTICABLE

After following these instructions, our hapless lieutenant was extremely dismayed to note that his oil pressure began to drop, oil temperature began to rise steadily, cylinder head temperature started to climb out of sight, and other general indications that his engine was steadily losing its oil and was about to burn up. To make matters worse, forced landings in this area were next to impossible, so he trimmed up the aircraft and elected to make a nylon letdown.

When the aircraft was found several days later, it was determined that the accident had been caused by failure of the oil supply line to carry oil from the propeller governor to the propeller. Further investigation revealed that the by-the-book actions of the lieutenant had unwittingly aggravated the situation by allowing the governor to pump the remaining oil supply overboard. If the propeller lever had been advanced to the full increase rpm position instead of being retarded to the full decrease rpm position, the pilot valve in the governor would have seated and cut off the flow of oil through the failed line.

CPT Brauch was with the Intermediate Maintenance Division, Dept of Maintenance, USAAVNS, Ft Rucker, Ala., when he wrote this article.

To what should this accident be credited? Pilot error? Not in the usual sense, since our friend had strictly and correctly (?) followed the procedures outlined in the emergency section of the -10. The pilot error which occurred in this instance must be shared equally by all aviators qualified in U-1A aircraft.

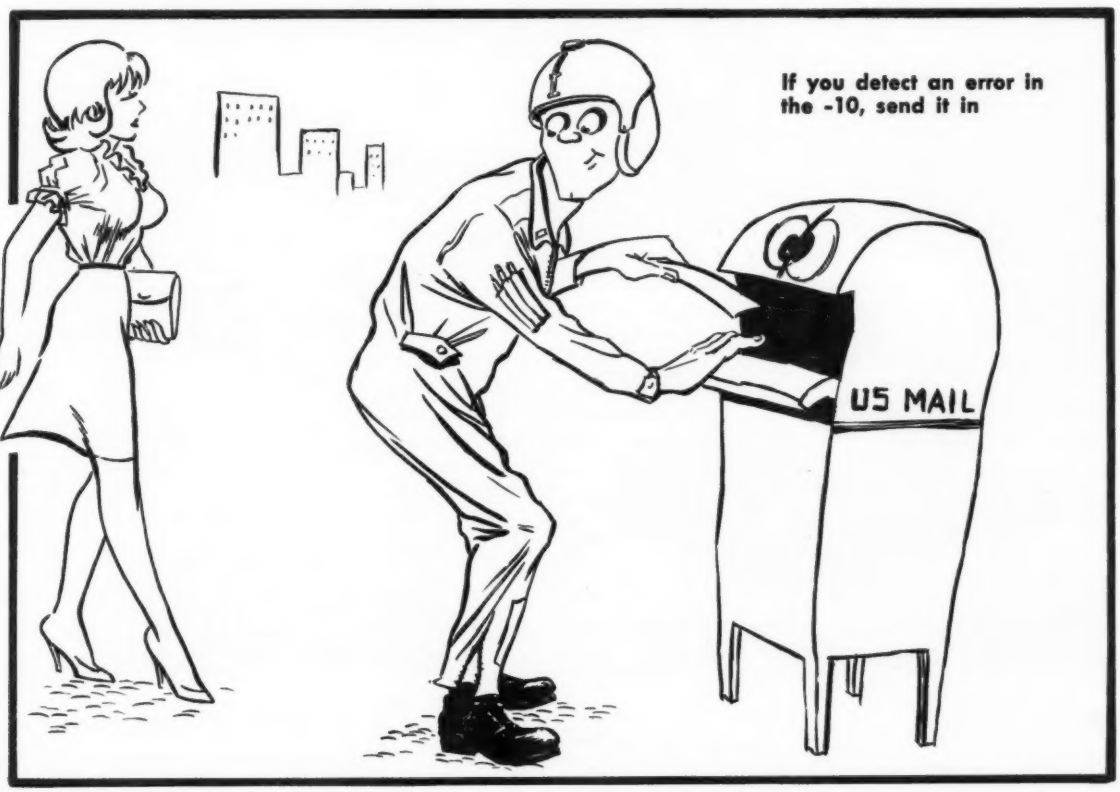
The error occurs in the quoted paragraph from the -10. Construction of the Hamilton Standard hydromatic propeller and the Woodward governor as installed on the U-1A is such that the propeller lever must be moved to the full increase rpm position to keep the governor from pumping the aircraft's entire oil supply overboard in event the oil supply line fails.

Loss of an aircraft is an expensive way to discover that an error has been made in the manual. This problem is not confined to U-1A aircraft, or even to fixed wing aircraft in general, but can occur in all manuals. A review of -10 manuals for all aircraft could expose many errors, some seemingly minor in detail but nonetheless errors, which could mislead and confuse an aviator and thus inadvertently bring about an accident.

What can be done to help correct these situations which may occur? A more thorough review of information at the U.S. Army Materiel Command (USAMC) before manuals are issued would help. Also a more thorough review by flight instructors involved in transition training in the particular type and model aircraft would help to catch even more errors. But there is a step beyond this which touches on the responsibility of all aviators qualified in each particular type and model aircraft. Chapter 1, section II, paragraph 1-8 (d) of most -10 manuals includes the following paragraph:

The direct reporting of errors, omissions and recommendations for improving this manual by the *individual user* is authorized and encouraged. DA Form 2028 will be used for reporting these improvements. This form may be completed using pen, pencil, or typewriter. DA Form 2028 will be completed by the *individual using this manual* and forwarded directly to: Commanding General, U. S. Army Aviation Materiel Command, P.O. Box 209, Main Office, St. Louis, Missouri 63166.

It is the responsibility of each aviator, when he notes an error in a -10 manual, to submit a DA Form 2028 as outlined above to have this error corrected. How many times have you noticed a discrepancy in the manual and began cursing those #%#?$# GS-99s for not knowing up from down. Cursing about it does not get the error corrected, but a 2028 does. When was the last time you submitted one?



SMALL, MEDIUM OR LARGE

Major Richard A. Wittbecker

Editor's note: TM 1-380, Aerial Observer Programmed Text, is now being printed at DA. Study of this 6-volume self-teaching TM should help the aviator/observer to become more proficient in identifying and locating targets such as discussed here.

MEDIUM tanks, moving southwest, at Sierra Kilo Niner Two Three, Four Seven Eight!" A surveillance pilot has just transmitted a spot report, complete and concise. But is it accurate? Let's sit in on the debriefing of the mission an hour and a half later.

Our pilot and an imagery interpreter are leaning over a viewer peering at a roll of negatives still wet from the photo van.

"It was right about here that I spotted those medium tanks."

The interpreter leans over a bit closer. "Are these the tanks?"

"Those are the ones, just coming out of the treeline!"

The interpreter looks up sharply, "Those aren't mediums; those are heavies!" He jumps for the phone to G-2 air. Why all the excitement? It's just a minor mistake in identity. After all, they are enemy tanks, moving southwest at the location transmitted in the spot report.

For two days the corps had been in contact with elements identified as a Combined Arms Army. The friendly divisions in contact were opposed by at least two motorized rifle divisions. The third rifle division had been generally located by means of radio intercept, but where the devil was the enemy tank division! The corps operations plan for tomorrow's assault had a mechanized division making the major effort. Location of the enemy tank division was the key to success or failure. Should the assault be delayed? Not a single report of any heavy tanks!

For many years Army Aviators were given observation training oriented toward and around adjustment of artillery fire. The student pilot was more concerned with locating the gun-target line, establishment of a bracket, and entering "fire for effect" as rapidly as possible than he was in the exact description of the target. Battlefield surveillance and more especially aerial reconnaissance were just bonus effects derived from the search for artillery targets.

Gradually, the surveillance mission assumed greater importance and new equipment and organizations were tailored for this specific mission. Pilot training, however, failed to keep pace with the equipment and techniques. It is an unfortunate fact of life that most early surveillance pilots were the original "self-help" group! A large part of this problem was unavoidable; there simply was no experience in infrared or side-looking radar. Techniques were developed in the field after the equipment reached the units. But in the area of visual observation, our pilots could have been and *could be* much better trained.

Many people look at the checkout in surveillance aircraft as just another transition into a "hot" aircraft (which it is not!). They fail to realize the pilot is becoming more than just a driver.

Many of the pilots themselves do not realize the surveillance aircraft (together with the armed helicopter) is merely what the Air Force terms a "platform." It is a means of transportation only in the sense that it positions sensory equipment over a desired point. (The best sensory equipment *should* be the pilot's eyeballs.)

The pilot's role in the intelligence collection effort and his position on the intelligence team has not been adequately taught.

Many of our surveillance pilots are trained, assigned to a surveillance unit (perhaps!) for one to two years, and then are assigned to other aviation duties. Surveillance equipment and techniques are constantly improving. Once out of this specialized field, the pilot soon becomes obsolete.

Now all of the above factors contributed to our particular surveillance pilot's failure to properly identify the enemy heavy tanks. Why was the interpreter able to identify the tanks at a glance when our pilot could not?

First, the difference in scope of training between the pilot and the interpreter is remarkably dissimilar. I say remarkably because they are supposed to be members of the same team. I'm not suggesting for a moment that we train surveillance pilots to be imagery interpreters. What I maintain is the surveillance pilot must have certain unique and specific skills not generally required of all aviators. During training, the interpreter had an opportunity to become at least acquainted with military materiel of other countries. The pilot did not.

Second, even discounting the difference in training in the above situation, the interpreter had a decided advantage. He was looking at a piece of equipment in precisely the same way every day. The pilot must look at objects on the ground from every conceivable angle.

Third, the pilot was obviously improperly briefed before the mission. But even with an inexperienced briefing officer the pilot should have known what questions to ask.

Finally, the pilot was improperly trained in the techniques of visual observation.

The present method of observer training, as described in FM 1-80, has come a long way from the period when artillery adjustment was the pilot's principal mission. Still, while terms such as "speed

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When this article was written MAJ Wittbecker was Assistant Operations Officer, Dept of Maintenance, USAAVNS, Ft Rucker, Ala.

Can you identify this tank? It's an M-48

of recognition" and "rapid identification" appear in the manual, very little instruction is devoted to explaining just how recognition of a target is accomplished.

Students are shown slides of *American* equipment made from aerial photographs taken at various altitudes and angles. The student then begins his flight training and identifies these same objects from the air. What are we training our pilot/observer to recognize? Whole objects. This system would be fine if we had pieces of equipment from every country in the world for the student to observe from the air.

Now the Air Force has been in the reconnaissance business for a few years too, but everyone knows that an Army Aviator can recognize Army equipment better than some jet-jockey, right? Wrong! The average Air Force recon pilot has probably never been closer, on the ground, than 10 miles of an M-60 tank, but he will rarely fail to identify one from the air. (He's moving about twice as fast as well.) Why? He's been trained to look at those tanks differently. The Army pilot has been trained to look at a M-60 tank, then a M-48, then another M-60, another M-48. The result, instant recognition, pretty smooth! But what happens when we throw a British Centurion into the picture? He's never seen one from the air before. Would an Air Force pilot identify the Centurion? He's never seen one from the air before, either. The odds are in favor of the Air Force pilot.

The difference in success between our Air Force pilot and the Army pilot (and don't forget the imagery interpreter) is the type of mental catalogue which they have been trained to use. If we could look inside our Army surveillance pilot's head we would probably find a mental card file something like this: TANK: M-48, M-60, Centurion, etc. How about the interpreter's mental index? TANK: Shape of turret, length of main gun, size and number of road wheels, wheel skirts, location of turret, muzzle-brake. CROSS-INDEX: M-48, M-60, Centurion, etc. See above characteristics.

In other words, even if our interpreter happened across a totally new piece of equipment, completely unknown to him, he could describe it in such detail that someone else could identify it. He has been trained to look at characteristics rather than the whole object.

Our training program for surveillance pilots must place more emphasis on *how* they identify an object. They must be trained to mentally dissect the objects they see on the ground. In the early part of the training program the student should be required to describe, *not* identify, the equipment which he has seen from the air.

Once the student becomes proficient at describing what he has seen, he has already begun to develop his mental index. This same student, when shown a photograph or sketch of foreign equipment, unconsciously breaks up the equipment into distinguishing characteristics. Once these characteristics are catalogued, he will be able to identify the equipment, regardless of from what altitude or angle he observes it.

What must we do to develop the best possible surveillance pilot?

First, provide more extensive training on all sensory equipment with more emphasis on visual observation techniques.

Second, teach the surveillance pilot how he fits into the intelligence team.

Third, give him at least some training in related intelligence skills. He should know what questions he needs answered.

Fourth, keep him assigned in the surveillance field as long as possible. Overspecialization is a nasty word, but specific skills are not developed and polished by isolated assignments.

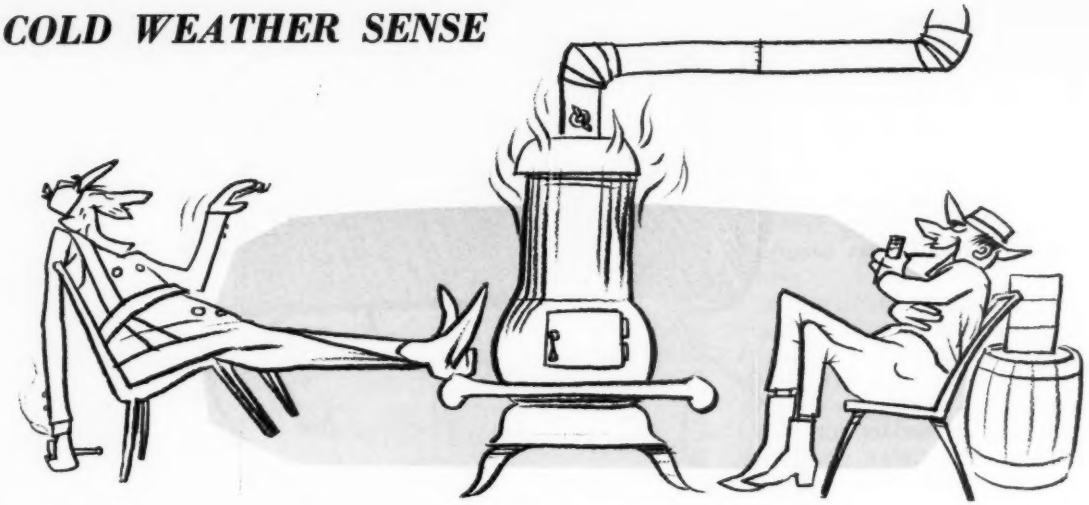
crash sense

colder and colder weather
demands more and more
of a man who has
less and less to give . . .

COLD WEATHER SENSE

Major Chester Goolrick

COLD WEATHER SENSE



BACK IN THE GOOD old days, sensible people made a point of staying indoors when the thermometer dropped below the freezing point. The only outdoorsmen who could be found going about their normal pursuits when the mercury fell through the bottom of the tube were Eskimo walrus hunters, U. S. postmen delivering Christmas packages, and assorted explorers floundering through the snow in search of the North Pole or Alaskan gold.

The Eskimos and postmen, poor souls, were making a living. They had learned to deal with the cold, as nasty as it could be.

More often than not, explorers who set out with a world of misplaced confidence, a team of dogs, some seal blubber, and several yards of polar bear fur never made it home. They failed to learn, until it was too late, what cold can do to a man who is not *fully* prepared to handle it.

In those happy times, every military leader worth a pair of tarnished epaulets was taught it was advisable to shut up shop when cold weather

They failed to learn, until it was too late . . .

rolled around. When the first frost appeared on the pumpkins and leaves began to change color, Lee and Grant went into winter quarters and stayed there until the robins came back in the spring. If they had not, if they had been foolish enough to try winter operations, their armies would have become so hopelessly bogged down with frost-bite, fouled-up equipment, mud, and morale generally on a level with the thermometer the Civil War might still be going on.

As we are all aware, times have changed — whether for better or for worse depends on your point of view. The Antarctic, which formerly had

a population consisting entirely of penguins, is beginning to look like Main Street on Saturday night. Alaska, Greenland, the northern reaches of Canada and other out-of-the-way (and frigid) spots are in the midst of booms which would make a housing developer sigh with envy. People who formerly thought of ice as something nice to have handy when you wanted to construct a mint julep now are accustomed to using it for building material. And as for military operations—Lee and Grant didn't realize how well off they really were.

What has brought about this revolution?

A new breed of men?

Not on your life.

Stick the average chap outside in a snowbank clad only in a T-shirt when the temperatures are subzero and he will freeze stiff as a barber pole in a matter of minutes, the way people always have. What has made the North Pole one of the world's way stations and the top of Mount Everest almost overcrowded during the rush season are

an increased respect for the hazards of cold,

knowledge of how to survive and work in extremes of cold, and

the equipment to handle it.

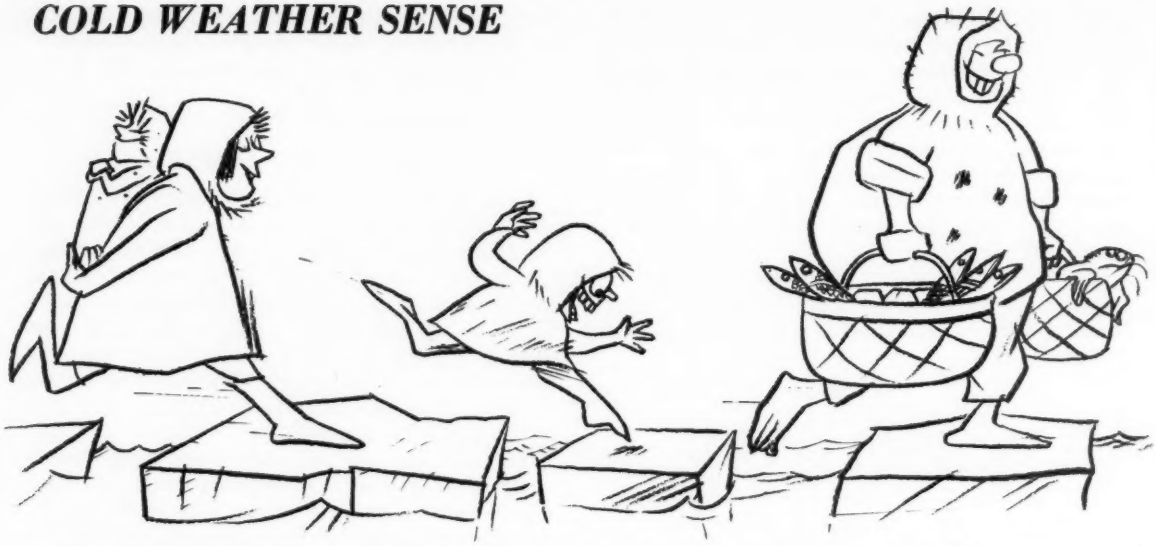
LOW — AND LOWER

Cold weather comes in about as many varieties as there are beans in a supermarket. Shove the thermometer a few degrees under zero on a crisp, dry day on Lake Winnebago, Wis., and you have a situation which can actually be enjoyable provided you have the right kind of gear — and happen to like ice-boating. Elevate it a little and bring on a wet snow which gets down your neck and soaks through your socks and even Ukluk, the walrus hunter, heads for the igloo.

There is also the fact that what is one man's cup of tea is another's dish of plain poison. Weather which makes a resident of the Florida Everglades curl up with a case of the shivers will start Ukluk thinking about taking the family on an all-day picnic. Even so, temperatures ranging as low as 70 below, such as the aviation battalion assigned to Operation Great Bear had to live in and work in Canada a few years ago, can be the death of any living thing which ventures outdoors *without being forewarned and forearmed.*

Extreme cold of this sort is deadly and existence in its becomes a constant battle for survival under the best of conditions. But even moderate cold, the kind which tempts your Aunt Gertrude to drop her knitting and head for the ski slope, can take something out of you. Your ability to live with it,

COLD WEATHER SENSE



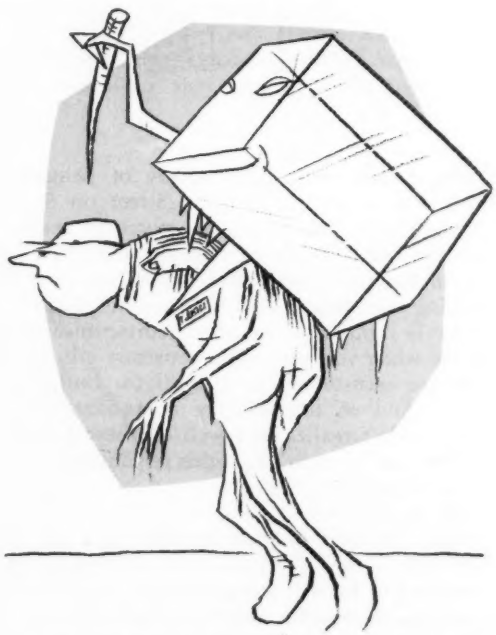
to cope with it, and to do a useful job in it depends on your appreciation of the fact that any time you have to be out in any weather where the temperature is much under freezing you are up against a relentless adversary which works on the careless tenderfoot the way a slow leak drains fuel from a tank.

COLDER AND COLDER WEATHER DEMANDS MORE AND MORE OF A MAN WHO HAS LESS AND LESS TO GIVE

If your physical system had a vote it would take sides with Lee and Grant. When it is subjected to bone-chilling temperatures, the body pulls in its defenses like an overmatched fighter covering up in the corner. The wheels don't turn over as fast. Metabolism — the rate at which you burn energy — is put on starvation rations. And the colder things get the more the machinery slows down.

A man in this condition can have a number of reactions. If it is cold enough, of course, and he isn't equipped to deal with the situation, eventually he freezes to death without even realizing what is happening to him. The cold first robs him of his will to survive and then moves in for a certain kill.

Happily, the number of Army Aviators who have frozen to death recently is roughly the same as those who have been knocked down in the streets by hansom cabs. The number who have been *affected* by cold to some extent while on duty is far larger. Even under the best of conditions and with the best of equipment, cold weather will get under a man's skin if he stays out in it long enough. The least anyone can expect is fingers and toes so numb they feel as if they had been carved out of Vermont granite, and if things go on long enough he may have a couple of deep-frozen ears to deal with.



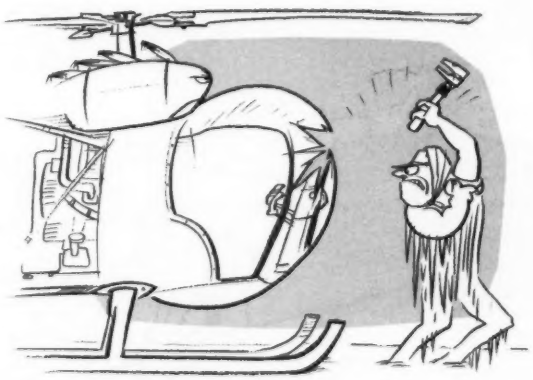
The cold first robs him of his will to survive and then moves in for the kill . . .

there is also the fact that what is one man's cup of tea is another's dish of plain poison

Nobody likes to be uncomfortable. Cold-induced discomfort, in particular, is not likely to put a chap in the sunny frame of mind for which he is justly famous at the Lodge's annual shore dinner. A man trying to repair the innards of a Sioux — or fly one — with fingers as stiff as a pair of $5 shoes will find himself using words not normally used around the best run Sunday Schools. If he doesn't watch himself, he may try to take it out on the Sioux by belting it a time or two with a wrench. Or he may forget to torque a bolt properly or replace a cotter pin.

The physical discomfort doesn't stop at just making a man as irritable as a hive of hornets. The irritability is bad enough. Nobody who has a chronic cold-induced mad on — at himself, the machine he is trying to fix or fly, or his fellow workers — is likely to earn any special commendations for efficiency. Cap this state with boredom and torpor — a don't-care-if-school-keeps-or-not attitude on the part of a unit's personnel — and you have a situation in which all concerned would be a lot better off if they could hole in and hibernate for the winter, like bears and woodchucks.

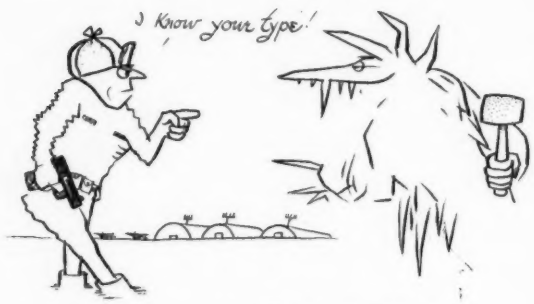
Yet none of these attitudes is uncommon; in fact, all have to be consciously resisted by any group of men trying to do an expert job in the cold. And when anyone lets down his defenses he automatically becomes a ripe victim for another assault the



If he doesn't watch himself, he may try to take it out on the Sioux . . .

Nobody who has a cold-induced mad on is likely to earn any special commendation for efficiency . . .

COLD WEATHER SENSE



Cold weather wears more disguises than Mandrake the Magician . . .

cold can mount from still another direction.

NOW YOU SEE IT, NOW YOU . . .

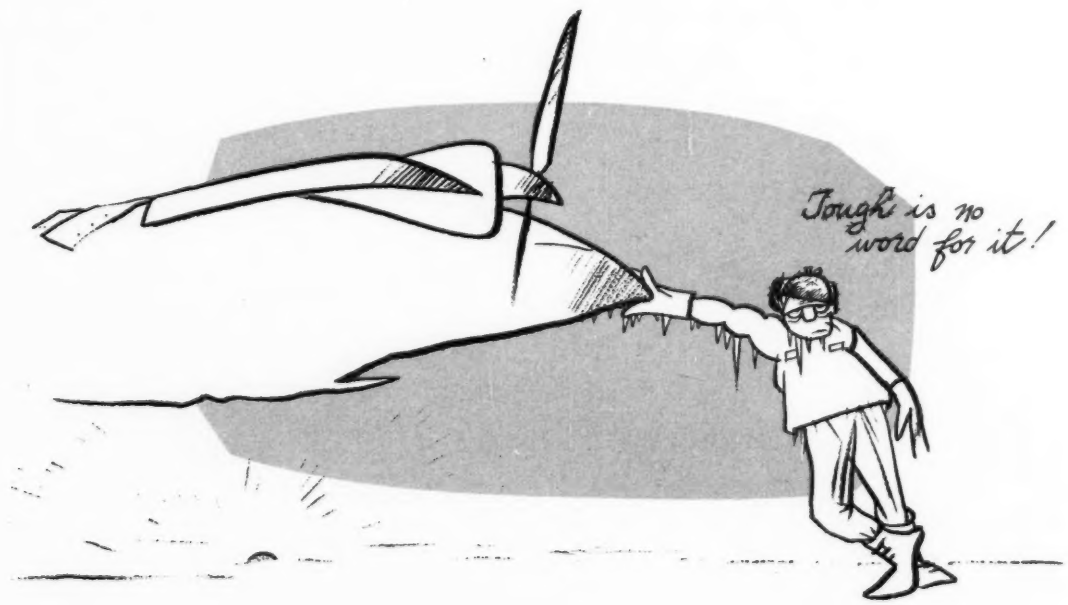
Extreme cold weather wears more disguises than Mandrake the Magician and is equally adept at pullings rabbits out of silk toppers, or at deceiving the yokels as to which shell the little pea is under. When the thermometer falls into the subzero class in the North Country and all the usual distractions — snow, ice, fog, sheet ice, and bonebare landscapes — are added to the picture, you can be almost certain that nothing will be what it seems.

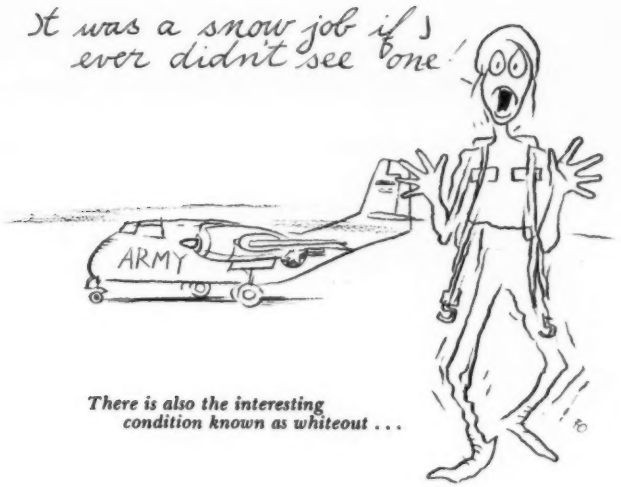
Things which appear to be only an enticing hoot-and-a-holler away, a stone's throw for a New York Mets outfielder, turn out to be a day's journey off by express dog sled. Perspective and depth perception are non-existent. Horizons are about as difficult to determine as tomorrow's stock market ratings. Instruments can be trusted about as far as you would the stranger with the thin mustache and the beady eyes who asks you to join him in a friendly game of poker to while away the train journey.

Trying to do a job and do it well with cold-numbed hands and toes is bad enough. Battling confusion makes it worse. When you pause to consider the built-in environmental hazards cold puts in the path of a beleagured person you begin to develop a not-so-pretty picture of how tough a proposition cold weather flying *really* is.

Take snow, for instance. It is indispensable for building snowmen and for rides in one hoss open sleighs. It looks splendid lying on the ground at Christmas. If you also give it half a chance it will obligingly cover an automobile graveyard, a swamp, or a field full of corn stalks to the point where they look as if they could accommodate a covey of Mohawks.

A sudden fall of snow can turn a pleasant VFR flight into a hairy IFR situation before a hapless pilot has time to begin thinking about a 180° turn.





There is also the interesting condition known as whiteout . . .

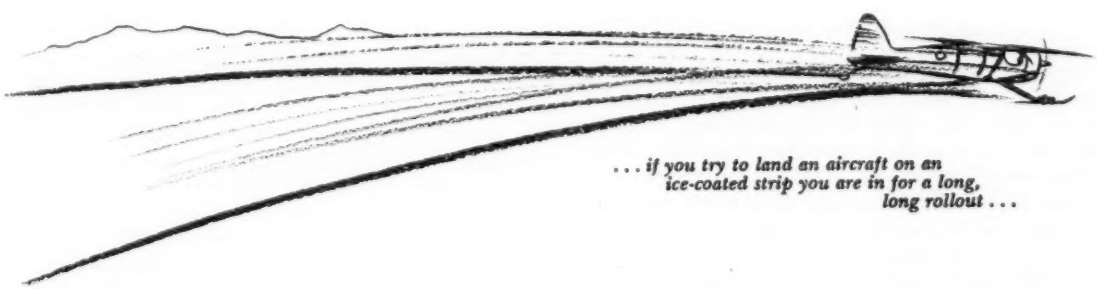
a list of what cold weather hazards are capable of would stretch from Ft Rucker to Spitsbergen . . .

Rotor blades on hovering helicopters can stir up so much snow, men on the ground and pilots of other descending aircraft get the impression they are engaged in a re-enactment of the Blizzard of '88. There is also the interesting — providing you are home reading about it and not trying to fly in it — condition known as the whiteout, a far-north atmospheric-surface phenomenon when light from snow on the ground and snow-laden clouds exactly match. Pilots encountering it have said later in shaky tones they felt as if they were trying to fly through a bottle of skim milk.

So snow, the small boy's best friend, is something else again for anyone in Army aviation who already feels as if he had been marked down for quick sale in the frozen foods department. Ice, fog, short hours of daylight, walruses on the runway — all the other nasty surprises cold can bring along in its bag of tricks — pitch in with enthusiasm to help make an aviator appreciate what the songwriter had in mind when he talked about summertime when the livin' is easy.

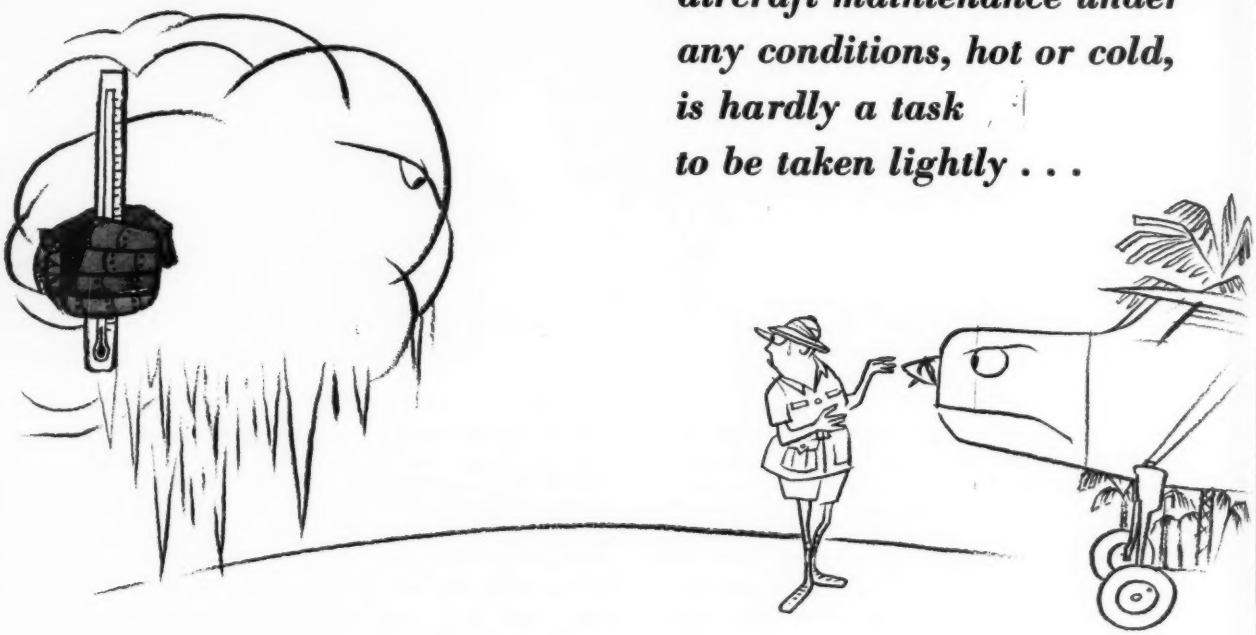
Maybe the point here is that you don't have to be an old hand with the experience of Admiral Perry to figure out that what the cold weather hazards are capable of would make a list which would stretch from Rucker to Spitsbergen. Nobody needs to be told that if you try to land an aircraft on an ice-coated strip you are in for a long, long rollout. (Some years ago a chap with an inquiring mind went out on a frozen lake to see how far he could drive a golf ball. It went 3½ miles.)

So that cold weather spells trouble is something everybody should grasp as easily as he does the concept that a person who dives off the top of the Empire State Building is in for a hard landing. Yet it is a matter of simple statistics that accidents resulting from some aspect of cold weather operations *do* take place and you can't always put it down to inexperience. More often than not, if you traced the dismal history of an accident to its beginning, you'd find that somebody — pilot, crewman, or maintenance man — was benumbed by cold to the point his wits got ice-jammed and he



. . . if you try to land an aircraft on an ice-coated strip you are in for a long, long rollout . . .

COLD WEATHER SENSE



aircraft maintenance under any conditions, hot or cold, is hardly a task to be taken lightly . . .

committed an error he never would have been guilty of in normal circumstances.

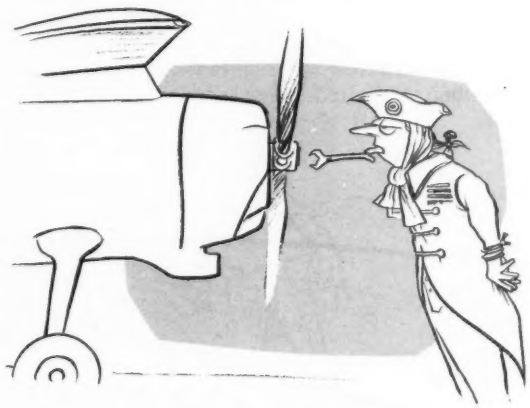
What, for instance, would you think of the pilot who lightened his load by removing his arctic survival kit to accommodate an extra passenger before taking off on a flight halfway across Greenland? Still wet behind the ears? Not a bit of it. It has been done, and by men every bit as bright and as experienced as the next boy in class. We will spare you the grisly details. This kind of cold-induced lunacy is extreme, but less apparent slips — such as a bolt improperly torqued by a mechanic standing ankle deep in slush—can be just as costly.

And, speaking of maintenance—

MAN'S BEST FRIEND

Aircraft aren't equipped to have fits of nerves caused by cold, but frigid weather can get to them just as much as it does to human beings. Any aircraft asked to operate in subzero temperature tends to become as cranky as a Missouri mule and twice as hard to handle. Servicing one is a test not only of a man's skill, but of all the patience and devotion he has at his command.

Aircraft maintenance under any conditions — hot, cold, lukewarm, rain or shine — is hardly a task to be taken lightly. At the heart of every mechanic's creed is the fact that the book must be followed every time and all the time, regardless. But right here is a nice, steel-jawed grizzly bear trap cold weather has waiting for the mechanic on an assignment in the cold country. *What constitutes*



Cold weather makes the mechanic's job tougher and as uncomfortable as Washington's men in 1776

A mechanic hooked by the cold can honestly think he has completed his work properly . . .

the book at Savannah and points south doesn't always hold true in the Yukon. To put it another way, the cold weather book always has several chapters nobody would ever have to learn if the Army would only follow Lee's and Grant's policies and shut down for the winter.

Deep cold which turns oil to the consistency of bubble gum, freezes tires to the runway, makes it impossible to touch metal with the bare hand, and coats every available surface with a thick layer of hoar frost, requires special techniques *in addition* to all the regular steps the maintenance book calls for. As if this were not enough, a cold weather mechanic's job is made tougher by his gloves and bulky clothing which make movement difficult and interfere with his sense of touch. And, no matter how well he is covered up, the cold will eventually penetrate his defenses, stiffening his fingers, bringing on a runny nose, and making him about as generally uncomfortable as Washington's men crossing the Delaware at Christmas in 1776.

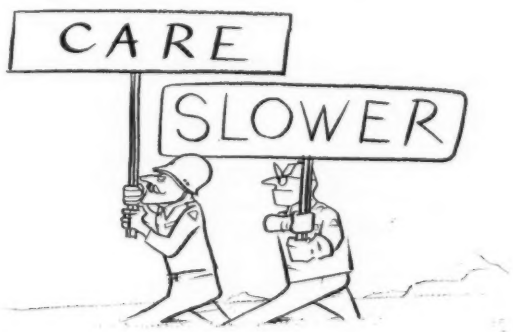
Unless he hasn't taken stock of the difficulties and what they can bring on, any mechanic working in the cold can lapse into a cold-induced attitude in which irritability is combined with boredom and indifference. His mind can foul things up by alternating between cursing the day he was born and wandering off into greener pastures, such as the centerfield bleachers in July. With his attention divided, a mechanic hooked by the cold can honestly think he has completed his work properly when actually he has omitted a step, fallen a victim to Murphy's Law, or left something only half done.

OUNCE OF PREVENTION

But leave us not think, gents, that mechanics are in a class by themselves when it comes to an allergy to cold. Nobody connected with Army aviation is immune and no amount of experience can allow a man to ignore what cold can do to him. *Anyone's* physical and mental processes can be slowed down by cold and *everybody* must constantly bear in mind the fact that the weather has him under heavy attack.

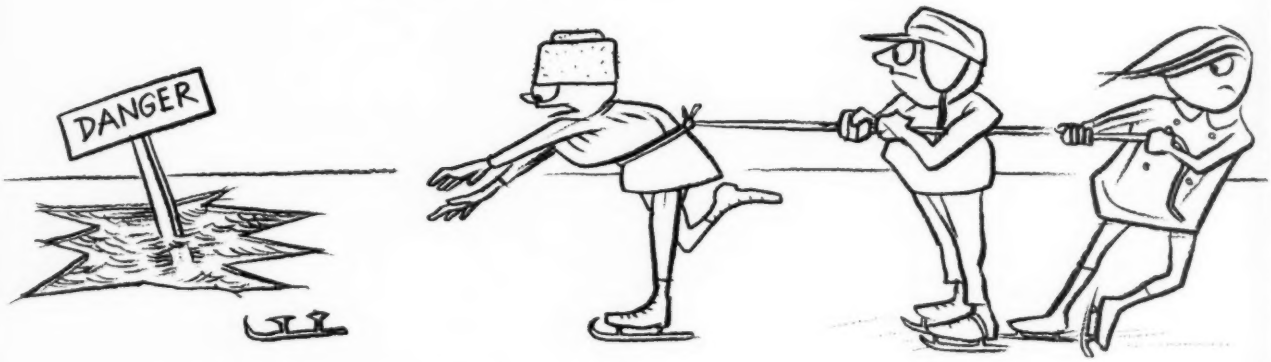
But be of good cheer. Cold weather flying *is* being done and done successfully every day, by men who don't enjoy being frost-bitten any more than you or I and who, given the opportunity, would just as soon shift the scene to Acapulco or even Death Valley.

To carry out their tasks, they have taken to heart a few simple cold weather laws:



COLD WEATHER SENSE

Army aviation cold weather operations require constant vigilance on the part of all hands . . .



• Beefing about the cold won't make it go away. Learn to live with it and get the job done.

• Don't rush. What takes an hour at Rucker takes two in the Far North.

• Be pessimistic. Expect the cold to do its worst. It will.

• Be consistent. Adopt the maintenance, flying, or operational procedure which is best for the particular area and mission and stick to it.

• Be prepared for the unexpected.

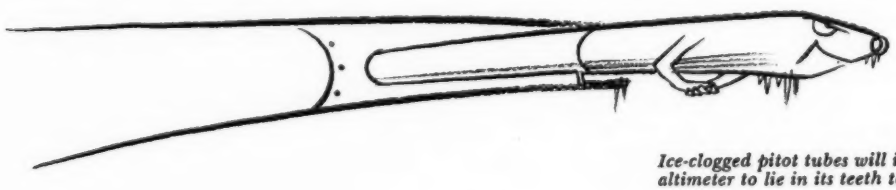
• Always take the extra step which amounts to a paid-up life insurance policy.

ONE MORE ROUND

The extra step? It is that all-important additional dollop of care and execution which any intelligent person puts into a critical and dangerous action as a simple means of keeping body and soul together. In Army aviation cold weather operations, it means that no detail is so unimportant as not to merit being gone over once and *then gone over again.* Simple flying or maintenance procedures which in warm weather require only *normal* action in cold weather must be approached with the sort of supernormal care Blondel, the high wire artist, uses when he sets out on a walk across the gorge at Niagara Falls. What is needed is the kind of constant, nose-to-the-grindstone vigilance on the part of all hands which would do credit to the chaps entrusted with the task of seeing that Goldfinger never gets his paws on the nation's reserves at Fort Knox.

There's the preflight, for instance. To be recommended highly, all will agree. In cold weather, you will often need *two,* the second after the engines have been started and all systems activated to be sure ice-clogged pitot tubes aren't instructing the altimeter to lie in its teeth to the pilot.

Further, in cold weather nobody goes it alone. Work should always be checked on under any cir-



Ice-clogged pitot tubes will instruct the altimeter to lie in its teeth to the pilot

cumstances and every copilot should be sufficiently alert to tell if the pilot is coming down with a sudden attack of mumps. In cold weather conditions, the need for this super vigilance becomes an absolute must. Our canny forefathers on the frontier always doubled the guard at the blockhouse when word came that the tribe down the trail was drinking firewater and laying in a new stock of scalping knives. When cold weather is abroad on the warpath, Army aviation defenses are tightened so that

> Nothing checkable isn't checked, and
> nothing foreseeable isn't foreseen.

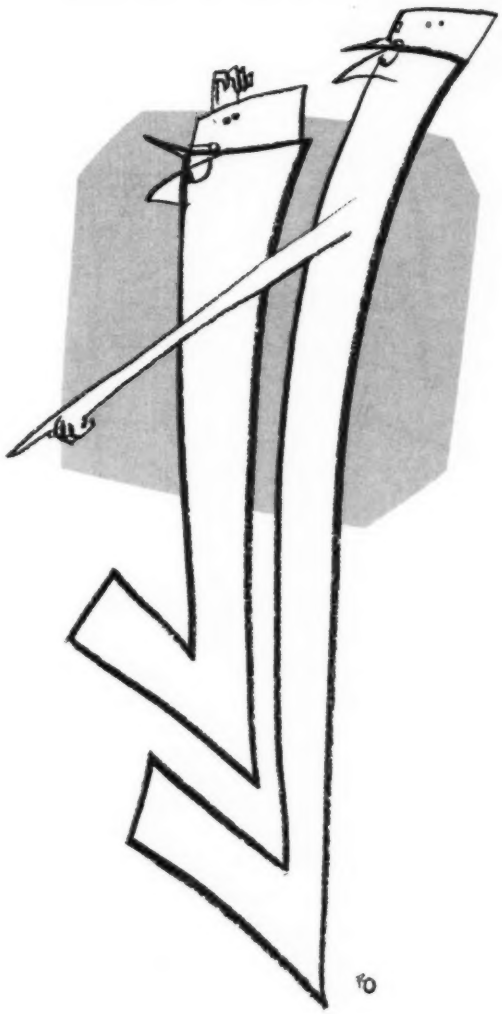
MAN WITH A MISSION

As far as actual flying is concerned, the best way to put it is that what is the simplest kind of operation at Fort Rucker in July can turn into a rousing nightmare which taxes every bit of a pilot's skill in cold weather. To put it another way, an aviator in cold weather nearly always has an overload of at least three things on his mental circuits in any given moment on a *normal* mission—

1. The ordinary job of flying the aircraft.
2. Taking care of cold weather-induced problems such as ice on the wings or blades.
3. Planning evasive action (Think Aheadness) to deal with conditions which can and probably will arise before he's safe back on the ground.

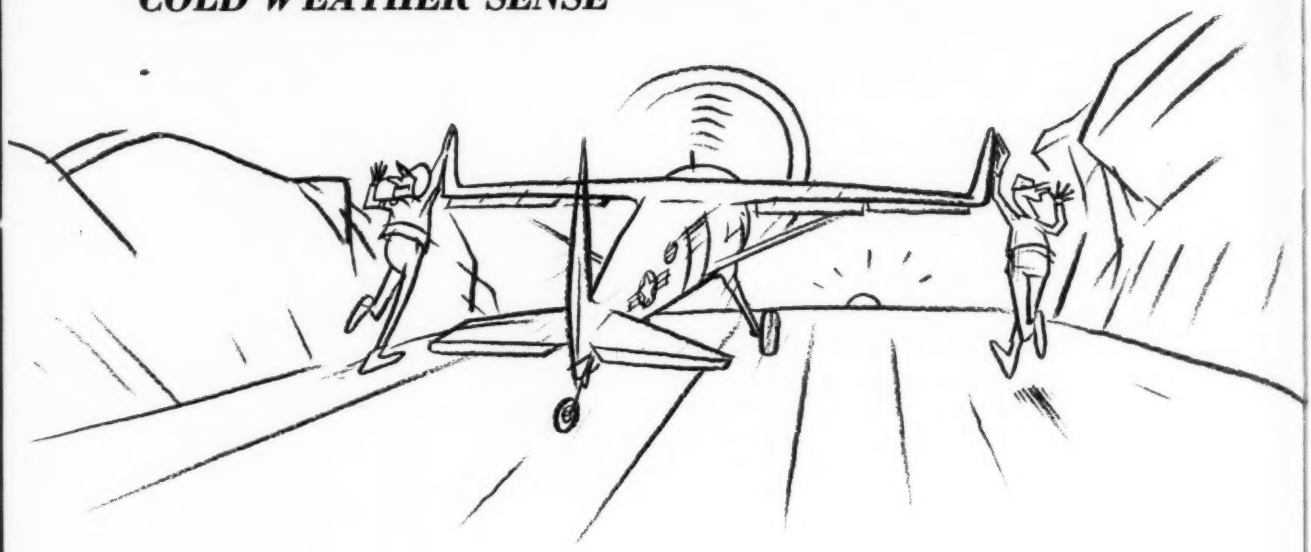
Just about every cold weather flight accident you could mention not directly caused by mechanical failure or a maintenance error can be laid at the door of a pilot who did a competent *routine* job of flying but who was dumped in the drifts by a special problem he had not anticipated. He had all the skill he needed. Where he lost out was in failing to appreciate the fact that cold demands the *extra* ounce of prevention, the *extra* margin in alertness, and foresight which makes the difference between successful and unsuccessful airmanship.

We might as well admit that it is wearying work, particularly when you consider that the man doing it may have already been worn down a degree below his peak by the cold. But it pays off. If you take the trouble to secure the services of a team of trusty wingwalkers before taxiing on icy runways or ramps you avoid snagging a wing in a snowbank. A check of weather conditions upwind before takeoff may show you the warm air which can cause fog before you get to your destination. Fussy attention to cabin heat will prevent fogging your windshield during a crucial point of descent. Taking care to apply pitot heat can keep your airspeed indicator from



In cold weather nobody goes it alone . . . work should always be double-checked under any circumstance . . .

COLD WEATHER SENSE



Secure the services of a team of trusty wingwalkers before taxiing on icy runways

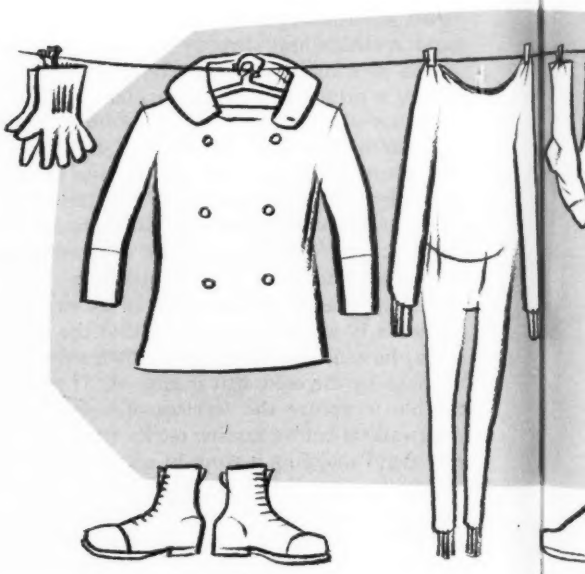
giving you a case of near heart failure by telling you your speed has dropped well below that of a respectable entry in a soap box derby.

As for *major* goofs such as we've already mentioned, such as leaving behind your survival kit, the pilot who pulled that one would probably be happy to tell you all about it in person if only anybody had ever been able to find him.

SMALL POTATOES

The extra attention to detail in all aspects of cold weather operations is one area where individual performance pays off like the jackpot in a silver dollar slot machine. Anyone who is a part of a large organization such as Army aviation, General Motors, or a major league farm system can be forgiven if he sometimes thinks of himself as only an insignificant cog in a mighty machine, about as important in the overall scheme of things as a mouse in a barn full of owls.

One of the bright things about the otherwise grey and overcast cold weather picture is that observation and experience can soon teach an intelligent man just how far off base such dismal notions are. Any day and every day, beginning when he puts on his clothes before going to work, he can see that what he personally does or does not do might have a telling effect on himself, his unit, and

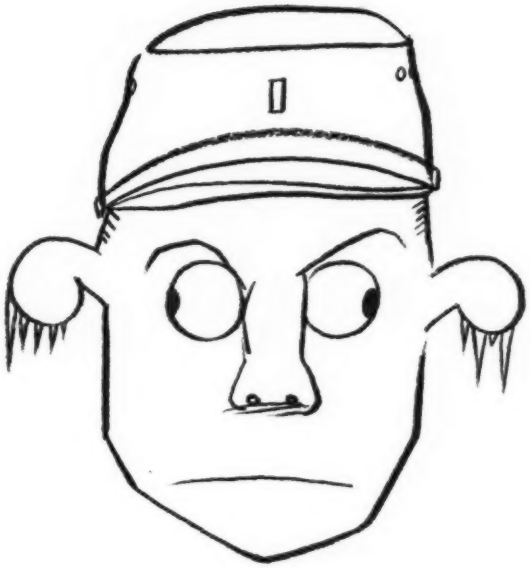


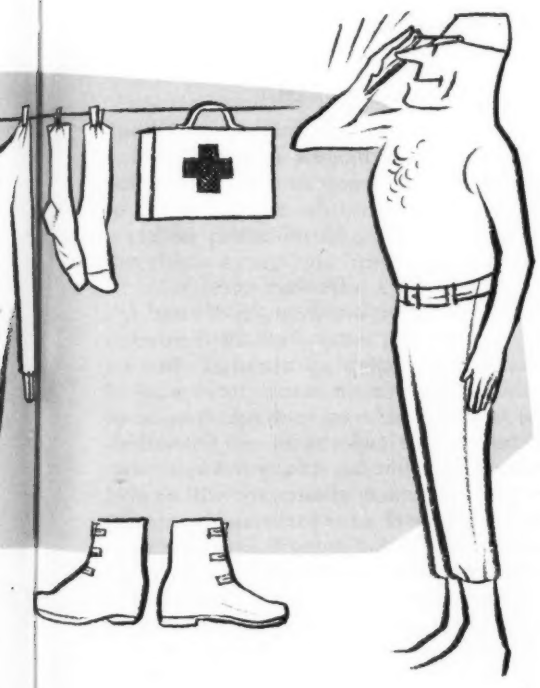
the entire operation before night falls and the northern lights appear.

In cold weather, the correct use of personal gear — including clothes — becomes all-important. As one old hand once observed, every pilot should take off on even a short northern flight as if he expected to have to walk back. The correct fit of shoes, socks, and gloves makes the difference between relative comfort for the man on the flight line and frostbitten fingers and toes.

Speaking of frostbite, *personal* knowledge of emergency techniques and treatments of cold-caused disabilities is another important area in which the small cog plays a major part. Nobody wants the aviation unit in the north to turn into a do-it-yourself medical battalion in which everybody goes around applying mustard plasters to cure cases of double pneumonia, but there will be times when correct, knowledgeable treatment of frostbite can save an ear or a toe. The knowledgeable part is what counts. If you think you rub snow on a frozen ear you have a couple of thinks coming and it just goes to show there is more to coping with cold weather than putting on that red flannel scarf Grandma ran up for you on your last birthday.

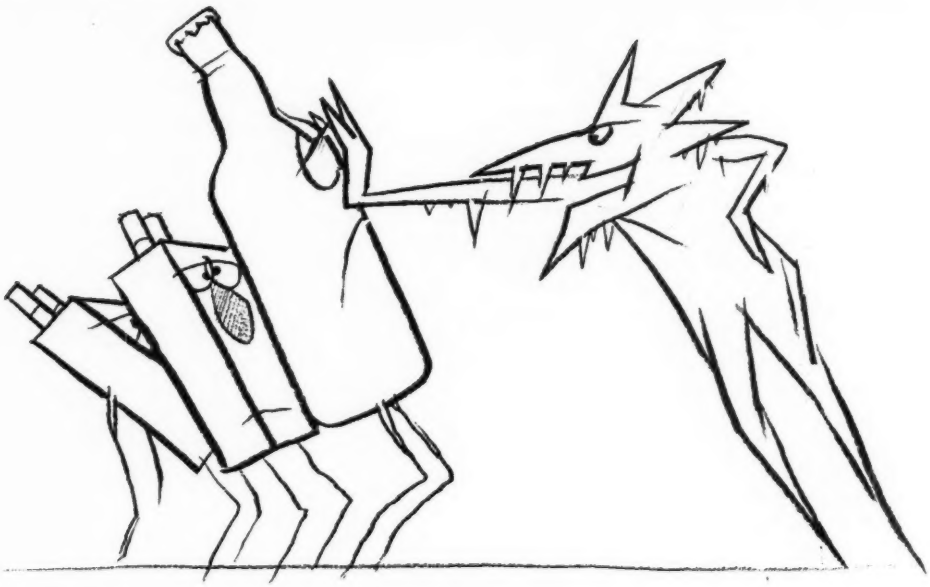
Another thing the snowbound man finds out





In cold weather, the correct use of personal gear . . . including clothes . . . becomes all important. The correct fit of shoes, socks, and gloves makes the difference between relative comfort and frostbitten fingers and toes

COLD WEATHER SENSE



In cold weather, the effect of too many beers and too much smoking is doubled . . .

from painful experience if he isn't careful is the effect too many cigarettes or one beer too many can have on the human frame in weather extremes. Nobody is at his tip-top best in any climate if he is a two-pack-a-day man or is suffering from a severe case of the whips and the jangles from staying too long at the party the night before. In cold weather, the effect is doubled. The man who is below par because of too much smoking, too many beers — or too much of anything — can be of about as much use to the team as a quarterback with a busted throwing arm. What is worse, he can be an actual menace by goofing off on some important task which can end by putting some other unfortunate (and innocent) soul down on an ice floe miles from home.

No machine, no matter how large, can afford a weak cog. *All* cogs are important. To be sure, a cog with a flaw can get by for a while when the machine is idling along. Put stress on it, go into high gear, and something gives way just when it is needed the most.

Cold weather puts just about all the stress on Army aviation's cogs they can take.

COOL, MAN, COOL

Any man handed the tough assignment of holding up his end of Army aviation in frigid weather has been automatically issued an additional ration of P's and Q's to mind. As if the normal hazards of aviation were not enough, he now finds he has a brand new set of problems, any one of which can be bone chilling in more ways than one.

The first job is to find out what the P's and Q's are. Some — not all, but some — can be discovered through homework, boning up ahead of time on what has already been found out at the expense of considerable sweat and many a hairy episode in such far-from-cozy lab experiments as Operations Great Bear and Deep Freeze. As any old hand who has done a tour in a winter wonderland will be glad to tell you at the drop of a fur parka, no one should ever go into a cold weather flying situation without sopping up every piece of information he can get in advance about the demands it will put on him and his job. They will also go on to say that he could study the situation longer than it takes to get a Ph.D. in quantum physics and still not be

. . . no man should ever go into a cold weather flying situation without sopping up every bit of information he can get in advance . . .

fully prepared for everything he can easily encounter in the course of one day's normal operations.

Discouraging? Not necessarily. It is on-the-job training, to be sure, and that is a situation in which every job trainee, from insurance salesmen to apprentice pretzel-benders, can avoid stubbing their toes by

following the book,
proceeding cautiously,
looking ahead, and
staying alert for the emergency.

Cold weather hands you situations in which even your problems have problems. No one who fails to follow the four handy-dandy rules listed above and who isn't in top physical and mental condition will get by very long without running into something he'd never encounter in warmer climates — and which he will discover too late he cannot handle.

Above all, your veteran snowman never fights the cold. He takes it in stride, knowing the wrong attitude only makes things worse.

You might say it is one case in which you stay warm by playing things cool.

Follow the book and proceed cautiously

AVCO-AWA Helicopter Heroism Award

from AWA Newsletter

THE AVCO-AWA Helicopter Heroism Award will be presented, starting in 1967, to a pilot, crewmember or other individual for outstanding heroism involving use of a helicopter.

The heroism award will be for a rescue or other humanitarian act in which a helicopter of any kind, civilian or military, is used.

A heroism award trophy, designed by sculptor John Amore, will be presented to the winner each year at the Aviation/Space Writers Association national conference. Travel expenses of the winner, together with those of spouse or other family member, to a total of $1,500, will be provided, as will a $300 honorarium.

Additionally, a permanent trophy will be provided, to remain with AWA and be inscribed each year with the name of the winner.

Judging will be a three-man board, assisted by a screening committee.

Any AWA member may make nominations for the heroism award, and nonmembers may submit nominations through an AWA member.

All nominations must be accompanied by authenticated supporting material. Deadline for entries for the first award is February 1, 1967.

Brigadier General G. P. Seneff, Jr., commander of the 1st Aviation Brigade, pins the new shoulder insignia of the brigade on the shoulder of SGM Rudy L. Summers.

THE GOLDEN HAWK

THE "GOLDEN HAWK" is becoming a familiar sight in Vietnam nowdays. It is found on the newly authorized crest and shoulder insignia of the 1st Aviation Brigade. The brigade, commanded by BG G. P. Seneff, Jr., is the Army's largest aviation unit, and commands all nondivisional Army aviation units serving in Vietnam.

Approval for the new insignia was granted by the U.S. Army Institute of Heraldry on 2 Aug 66. The shoulder insignia is a shield shaped patch of ultramarine blue with an 1/8 inch golden border. In the center of the blue field is a red hilted, unsheathed crusader's sword with a swooping golden hawk grasping the hilt in its talons.

The unsheathed crusader's sword represents the origin of the mission of the brigade in Vietnam. The hawk is a symbol of the concept developed during 11th Air Assault tests in 1963, and represents the impact of Army aviation on ground warfare. The gold of the hawk and the red hilt of the sword are the colors of the Republic of Vietnam, MACV, and USARV. MACV and USARV are commands under which the brigade was formed and now serves in combat.

Approval of the new shoulder patch is unique in that this is the first time since the old Army Air Corps that an Army aviation command has been granted individual recognition in the form of distinctive shoulder insignia of its own in combat.

MODIFIED MOHAWK

THE ARMY HAS accepted the first in a series of modified OV-1C Mohawk airplanes which are a part of an extensive updating program.

The modification program involves the installation of new avionic systems, the incorporation of current engineering data, and several airframe changes.

The major airframe change is to replace the Lycoming T53-L-3 engine with the T53-L-7. The L-7 has a maximum power of 1,100 shaft horsepower at sea level, a specific fuel consumption at maximum power of 641 pounds per hour and weighs 522 pounds dry. The L-3 engine has 960 shaft horsepower at sea level, a specific fuel consumption at maximum power of 655 pounds per hour and weighs 530 pounds dry.

Major Changes

Avionic changes are as follows:

- **Modified AAS-14A IR Detecting Set and modified ART-41A IR Data Transmitter, comprising the airborne IR surveillance system. (This is the militarized version of the limited production system installed previously, and will provide increased performance capability.)**
- **Complete provisions for the APX-68. (Existing cabling and provisions for the APX-44 IFF Set shall be retained, however as an alternate to the APX-68; the existing APX-44 antenna can be utilized for either the APX-44 or the APX-68.)**
- **ARC-54 FM Radio Set and ARA-56 FM Homer Group to replace the ARC-44.**
- **R-844/ARN-58 Marker Beacon/Glide Slope Receiver to replace the R-1041 Marker Beacon System.**
- **Modifications to the MA-1 Compass System to provide alternate compatibility with the ASN-62 Compass System.**
- **Modified ARC-111 VHF to provide an alternate to the T-366 VHF Emergency Transmitter.**
- **Inclusion of two ARN-30E systems, one ARN-59 AOF system, and complete provisions for the ARC-112 AM 55B/HF Radio Set.**
- **Provisions for the ARC-51BX Radio Set, with removal of cables for the ARC-55. (An adapter kit will be provided to permit utilization of the ARC-55 with ARC-51 cabling; the ARC-55 will be installed.)**

Airframe changes are as follows:

- **Installation of T53-L-7 engines**
- **Deactivation of wing slots**
- **Larger windshield wash tank**
- **Message drop chute**